

THE
SURGICAL CLINICS
OF
NORTH AMERICA

JUNE 1929
VOLUME 9—NUMBER 3
NEW YORK NUMBER

PHILADELPHIA AND LONDON
W B SAUNDERS COMPANY

PUBLISHED MONTHLY (EXCEPT JULY AND AUGUST) BY W. B. SAUNDERS COMPANY, 529 N. ARCH ST., PHILADELPHIA, PA.
NEW YORK: 15 E. 12TH ST.
WASHINGTON: 1115 K ST., N.W.

THE SURGICAL CLINICS OF NORTH AMERICA

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CLINIC OF DR. CHARLES CORDON HAYD

THE NEW YORK POST GRADUATE HOSPITAL

RIEDEL'S STRUMA BENIGN GRANULOMA OF THE THYROID

Riedel's Struma A Chronic Inflammatory Disease of a Granulomatous Nature Usually Diagnosed Clinically as a Malignancy Dyspnea Appears Early Not Associated with Disturbed Thyroid Function Symptoms Due Entirely to Compression Three Stages of the Disease Described Histologic Data Presented

History The patient is a man fifty-two years of age married a single man born in Roumania and has resided in the city of New York for the past thirty-seven years. The patient's chief complaint is a lump on the right side of the neck. The family history of the patient is unimportant and the personal history is in no way noteworthy except that the patient lost his vision following an accident twelve years ago and which suggests a unilateral exophthalmos with fixity of gaze.

His present illness began about fourteen months ago when the patient noticed the lump on the right side of the neck. He did not find the clinical significance of the tumor when first noticed. It was felt to be about the size of a small hen's egg. The patient consulted his physician and came to the Outpatient Department of the New York Post Graduate Hospital and was admitted for operation on September 20, 1927, with the clinical diagnosis of a tumor of the thyroid. At that time physical examination revealed a mass on the right side of the neck 5 by 3 cm. and

appearing about an inch above the right clavicle. The upper part of the tumor was soft compressible and with a smaller area below that was hard and distinct from the main enlargement of the right lobe of the thyroid. The lower pole of the tumor extended below the clavicle and approached the midline. There was no exophthalmos, no tremor, no tachycardia. The preoperative diagnosis was carcinoma of the thyroid. The basal metabolism taken previous to admission was six above the average normal. The patient was operated upon on September 21, 1937. At operation there was found a diffuse enlargement of the right lobe of the thyroid with extreme fibrosis. These changes were confined however only to the right lobe. There was no encapsulation and the whole process suggested an adenomatous possibly with malignancy. The operative note at that time stated that the general appearance of the cut thyroid suggested a gland that had been subjected to prolonged iodine or x-ray therapy.

The operation consisted of a typical thyroid exposure and a resection of the anterior two thirds of the right lobe of the thyroid gland. Considerable difficulty was encountered in mobilizing the thyroid on account of the marked perithyroiditis. The extracapsular volume required a pelvic dextro and while hemorrhage was profuse it was not serious. Hemostasis was assured the wound was closed aatomically and the small subcutaneous drain of rubber tube.

The patient made an excellent recovery and was discharged from the hospital on September 28th, eight days after operation.

The pathological report at that time described a mass 7.5 x 5.3 x 3.8 cm. of a pink hard color. On section it showed numerous small irregular lobules but little could be discerned in the gross. It was beefy in color and irregular outline. It was fibrous spot was noted in the microscopic examination. The picture was that of a metastatic carcinoma. It was not typical of a benign gland. The carcinoma and growth of the lymphoid element included lymphaticoma. It was classified by the pathologist as a carcinoma with lymphatic involvement.

mato as described in 1912 by Hashimoto and which is now considered as an earlier form of the ligneous struma described first by Riedel in 1897. The condition is a granulomatous strumitis which has been observed in our laboratory in three different stages. The early form is the struma lymphomatosa representing only a moderate lymphoid increase with compressed epithelial elements. The intermediary form is characterized by a marked increase in the lymphatic tissue with destruction of the epithelial elements. The late stage is characterized by an almost complete fibrosis of the gland.

In the interval between September 1927 and October 1928 the patient made numerous visits to the Goiter Clinic at the New York Post Graduate Hospital and was under observation during the entire time and at various periods received both thyroid extract and iodine in small doses. During the year the patient complained of pain in the midline of the neck which became progressively worse as the thyroid tumor recurred. The patient was readmitted to the Post Graduate Hospital on October 9, 1928. His chief complaint on admission was a mass on the right side and midline of the neck. On physical examination there was an irregular nodular mass approximately 6 by 7 cm. just to the right of the midline and behind the clavicle. It moved on swallowing, seems firmly attached to the thyroid cartilage and surrounding muscle and can be moved on palpation only en masse. The basal metabolism was twelve above the average normal. The clinical diagnosis was Riedel's struma (recurrent).

Discussion. In brief we have a man fifty-three years of age who in September 1926 had a resection of the right lobe of the thyroid for a new growth or pathologic change in the right lobe of the thyroid that suggested a diffuse adenomatous change or possibly a malignancy. At that time he had a resection of the right lobe. The diagnosis did not suggest any of the hyperplasia that occurs with or as the result of thyrotoxicosis. We were frankly quite surprised at the pathologic diagnosis of

This case filled the column of the report but for complete details see the serials.

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The operation consisted of a typical thyroid exposure and a resection of the anterior two thirds of the right lobe of the thyroid gland. Considerable difficulty was encountered in mobilizing the thyroid on account of the marked perithyroiditis. The trachea was protected by a rubber sheet and the scalp laceration and the hemorrhage were profuse. It was not serious. Hemostasis being assured the wound was closed in anatomic fashion with a small subcutaneous drainage rubber tube.

The patient made an uneventful recovery and was discharged from the hospital on September 28th eight days after operation.

The pathological report at that time described a mass 5.3 x 3.8 cm. of pinkish red color. On section it showed numerous small glandular lobules but no colloid could be recognized in the groups. It was beefy in consistency, regular in outline and a few fibrous spots were noted. On microscopic examination the picture was not characteristic of a thyroid carcinoma. It was not typical of Baskin's goiter and the arrangement of the lymphoid elements excluded lymphoma. It was classified by the pathologist as strum lymphoma.

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diagnosis of malignancy which time proved incorrect. The condition is essentially a progressive and continuing lesion and death is usually brought about by a pharyngitis. At the present time surgery offers the only hope of relief and should be carried out as early as possible as the disease may be entirely confined to one lobe of the thyroid although it is evident that there is a tendency to spread throughout the entire gland as in the case presented. Following a complete thyroidectomy which should be the object aimed at a possible postoperative tetany is to be anticipated. Myxedema is the end result and will necessitate continuous thyroid feeding after operation. Deep x-ray offers the best agency that we have to prevent recurrence. It is obvious that all dental and tonsillar infection should be cleaned up either before or after the thyroidectomy so that there is no focus of infection escape from the nasopharyngeal or buccal cavity. The possibility of secondary stenosis of the trachea should be borne in mind and the bronchoscopy performed at intervals of six months for at least three years succeeding the thyroidectomy.

We have been fortunate in the last three years in having 3 cases of undoubtedly Priedel's struma. Our material has been studied with particular care and I have asked Dr Louise H. Meeker of the Department of Pathology of the New York Postgraduate Medical School and Hospital to present the pathological aspects of this condition.

DR MEKKER: Priedel's iron hard struma is a form of chronic inflammation of the thyroid gland which has not received much consideration in this country from either the surgeon or the pathologist. The observations of Fung are an exception to the general dearth in the English language. This peculiar struma occurs about equally in both sexes as a rule before the fortieth year and usually both lobes are affected. The duration of the disease is usually brief from a few weeks to six months and there is usually a record of previous good health. More than half the cases are characterized by local adhesions about the trachea and large vessels and nerve. Pressure may give rise to attacks of acute laryngitis. The tumor-like growth is very hard compared to iron by Priedel to cartilage by Taillfer to bone by

Riedel's struma A year later the patient had an extensive regrowth with symptoms of moderate compression of his trachea and esophagus together with an extracapsular invasive process to the thyroid capsule and to the perithyroidal musculature. The mechanical effect of compression provided the surgical indication rather than a hypersecretory overfunction or dysfunction of the thyroid.

Riedel's struma is apparently a chronic inflammatory disease of a granulomatous nature. From the cases reported it appears to be an infrequent condition if not rare for up to 1924 Shaw and Smith had collected only 23 cases from the literature. It is recorded as occurring in 48 cases in 10,500 thyroidectomies in the Mayo Clinic. The disease manifests itself usually in the second and fourth decade and occurs about equally in the two sexes. Syphilis and tuberculosis are not factors in its production although dental infection may be the initiating cause in some cases. It is apparently not sequentially dependent upon a previous goiter. The outstanding symptom is dyspnea and the symptom is mostly all referable to pressure. The disease histologically is characterized by marked extracapsular extension with invasion of the tracheal muscles and blood vessels and pressure on the tracheal bronchi and partial of the recurrent laryngeal nerves. The condition has been reported to have extended up to the base of the brain and down into the mediastinum. The patient may complain of loss of voice, aching pull or midline pain beneath the thyroid cartilage. Dysphagia is a frequent but dyspnea appears usually and seems to be out of all proportion to the size of the gland. Growth. On palpation the thyroid exhibits marked hardness and has been variously described as a mass of plaster-of-Paris hardness. It possesses no elasticity, has an hyperplastic or colloid gland. No relation is usually found with adherence to muscles and surrounding tissue. It is well demarcated from the surrounding tissues but not medially. It is illimitable in the skin and in this distinction differs from carcinoma or carcinoma. Clinically it is usually diagnosed as malignant disease. In the clinical and pathological material made

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DR. MECKER: Riedel's struma is a form of chronic inflammation of the thyroid gland which has not received much consideration in this country from either the surgeon or the pathologist. The observations of Lwing are an exception to the general dearth in the English language. This peculiar struma occurs about equally in both sexes as a rule before the fortieth year and commonly both lobes are affected. The duration of the disease is usually less than a few weeks to six months and there is usually a record of previous good health. More than half the cases are characterized by intense adhesions about the trachea and the vessels and nerves. These may give rise to attacks of acute distress. The tumor-like growth is very hard compared to iron but is soft to cartilage by Taubert's test and bone by

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Reca d and to wood by the French autho The si e varies greatly the shape i u ually l ke the thyroid but m y be sl ghtly nodular Rarely it is enrafted on a pr vious goiter

With few xceptions the p eoepati e diaono ha been c cinoma The etrog e ion after partial extirpation ha been the tr kin clinal ma fe tation f atu e v hile the d agno of n n mal g nev upo microscopic examinaton ha been equally surp ing Histologic descriptions a e with few e cept o s in

ent al det id with that of Ridel Murr y compared his ca with an adva ed cas f myxedema nd Ha him t f und ch eiv lymph foll le and called hu c ses t uma lymphomat a They wer rather an ea lv sta e of R edel trum pointed out by Ewing

A atomically th di case i character ed in it e rly st ge by hyp rpl ia f th parenchym and l ter by a hronic infl m m tory nfiltrat on by lymphocytes pl ma c lls a deo inophl leukocyte with sl ht nflamm tory cha e n the pa t of the ves els Tue lymph foll cle a e abu dant e pecally n the arl r sta s A a sult the e tensiv de ene at n of the pare chyma nd p l f t on f fibr u t u which i p e e t n r m rklabl m unt in the l te ta es Thus i flammato v action mav e t nd f r b vond th l m ts of the gl l

Three i t nc s f thi t pe of got hav c me u d ur ob ervat o The ca llustrat what cept d by m t path logi t a lv nt rmed ate a d l t t e f th d ea

C L—P th l g port m f d d f m d F
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gh d 25 gr m Th t t f a so h rr gul b
ppe d h b h l d f m d g I w h h d
d se sold th gh lgh gr y h d b h
th t l f
M sc p (F g 169) Th sc h l d l l g l
f t t Rema t f thy d t s f d h gh h pe m
d som pl ce f ly l l d f d l b l f h t h l l d
g l l Th d ff se f
ma y pl th fib b d d se d l sly d Th m k
bl feat th b f lymph f l l h h ct p l f
p gr ss M t d figu es p se h l m h
d bl mbe m y fi be g t d l mm
f ld Th hy d l l d d ppe t be hype pl t b h be



F 169—(La ly t g) (C se l) Thy d se t th l ft
 rep t f l comp cell ly phoc t fll t At th ght th
 th cel k l mph l fll l il po) (Ph t m g ph)

l t g k l f mp by th gr th f l mph t t
 d fl sc Th t t a th t f dff se h fl mm t f
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 l) f R l l
 D g B k h g l f l tl d (P d l trum)

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 l m l l l h mall l l g l l l sepa d
 l l f l l N l l co l l be ec gn l
 M r l l g l o Sect f pe t f th th j
 y ed l l l C ect re so sep f a g th k es
 l fed h l re l l l s l l bul f m l l l l ze
 Th l ser ce Occa l l f ecog ed
 l l l s h fl ed cubo l l p h l l l l pal g
 coll l h l M l h e collec f th l p h lal
 cell l lmped l l l f sed l rwh l g mbe f
 m l l l sed red cell h l kl g l u l cy th
 l pr l l m l h Th se la k me pr l
 l lloc N l ed ru l mgt f l l s th

d figu th se g m l d d by f m ll
lymph cy l m l m fth l m fth p h l l d sq m



Fig 10—(H h m typ) (C se II) Th p l gul
l d f p h l m Th d l d sely pa k d l mph t m
fib t m (Lo po) (Ph m cr gr ph)

t d p h l l ll gg g g t ll f m f h f gn body type
t d l som h fib p d m t
D gn S m l-mph m sa m d y g (R: d l t m)

C IL—Se l pe m m d d m h l t
l co t d f fi p cc g h ghung bo 9 gr m Th l ge-t
p ce m d 50 3 0 mm d d h fib cap l th
fi t b l fi m d l d h d β h pe h ce t l
fib N typ cal ll f se Th h p m d espe t ly
50 20 10 mm 0 15 mm 0 20 10 m l 30 10 mm
Th se p se d y f som g y d d som p l d
y ll Th l g p rt d l l g g
ll d
M p Th se p se d p ct l sel < bl h
l pe m Th p h l l l d h d m m to hg d h
fib m b d h d ct h l mph cy
D gn R d l rum rt

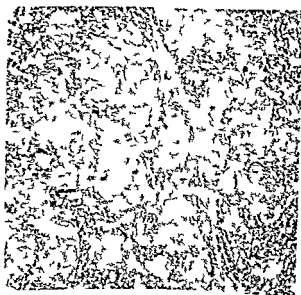
C e III—(I ly pot d D T H R sell) M fifty y
 th p t t m pl d ly f ll g th k f l g y ght d
 h se F m ly h t y l l pe so l h t y m p r t t
 Tl l g m t f t l k h d be b s e r v d f f i m th b e f d
 t h l g l l y d t h o t p l t l y l e d b o t h l b e s
 f t l t h y l g l d d t t m l y h d T h t l w l g d
 l t h s e f l m m t f t h p h r y d t h T h p
 p e t l g c a m
 A t p e t t h t m m m d t t h t g t d f i l t y
 P t p e t r y w t f l T t h l t t h e p a t t
 t l d d h d h y p e t p h f i b d p t l l t
 R t p o t d c a t t h t t h p t t h d f l l y d h h l t h



F 11—(C se III) Th k pl f g p e c m

Tl g c l f (F 171) p e s e t d l m t y m t c a l
 l r g f l l l b e f h h y l g l d d m r e d 19 6 4 m
 Th m l f c e p r e s e l l d p m c e b u t a m o o t h c e p t
 f l l c a f l t l Th p s u l t l k l d t t h w
 k l s e l Th p e c m r e y h l l s e c t
 t h c a f c e w h p r e s e l t h s a p p r e c e y l l h h
 h h l c e l b e r e l l r e g u l p a q s o m h t
 w g g e g l l l Th r e l l c o l l f A m a f l y m p h o d e s
 f 8 5 c m b e d l m l l f h t s e f b o d
 Th s e o d f i l s e c t l g h p k h m a l l h m o r t h g p o
 Tl h w l g r u c t r e g e l m a l u h
 l l h g l m D J m e l t h m h m e r s c o p
 p e c m e l m t e d r e c o g n r e d h c o d t u o f l l t t g e f
 k o e d l r a m a

d figu hese g m l ce t d d h f ller
 lymphocvt l m l som f h l m f th p h lual d q



Fg 10—(H h m type) (C se II) Tl p l
 la d f p h l m Th d k d sel pa l l lymphoc gular
 fib rom (Lo po) (Ih m gr ph un

d p h l l cell g e t g g cell f m f h f gn bod t pr
 d l som th fib p d m
 D gn s m l mph m sa m d rv g R d l trum)

C IL—Sec d pec m m d d m h l
 It t d f fi p ces g h gh g bo) g m Th l et
 p m red 50 i 0 m d co d h fib cap
 fi b lt fi m d l d h d flesh pe
 fib os \ t p cal ll l see Th h pec m d
 0 20 10 m 0 15 mm 50 0 10 mm i 30
 Th se p ese d f su som gr) d d som p
 y ll Th l ce g port d l l
 ll l
 M sc p Th se p se d p l sety se l
 I pe m Th p h lual l d h p d mo m hg d
 fib su m b dan h red h lymph
 Diagn R d l er cu

Th ill fi dly ph od l m t b d t th cap l b t
 th y f d th gh t th b t f th pe t l t d
 ft se l h q t m t f t f ce Th se f l l
 pec lly p t th m g f th g bl thy d l b l
 S h f l l f m 100 t 900 m d m t w th lymph yt t th
 t d b d t pl m ll th pe ph l A t g m l
 t l k g

Th bl d pply pl t f l b t t t k g f t th p th
 l g p t O ca lly scl w th th k d ll see Ra ly
 som f th se t p l g p f p th l l ll co t d (Fg
 173) Th se ll t p t f t d pp t h pe t d
 th ly lght h g th m d t f th fl mmat ry t f m t
 oc g th d g thy d t S h t m y be f d
 lymph od l (Fg 173) t l b l sept m th th thy d
 l l l A rul th t l t y (Fg 173) b t th y m y b p d



Fig 13—(C se III) l l lual ll s (I) l mph f l l A t
 h l g cell ll sem t mb (h gh po)

se l be f d m sc of fi ll Se l l sly l ted gr ps
 f h se t re f l j t l e th th t r n p l th ce t l
 f h l t l lobe Th h p e f m d d al m ses
 t g l l l h l p h th k l l p l ga so Th me s-
 re 10 t 00 f m Th p h l l cell se e l d p h d
 th l es p l f l lase m m ml Th re h e
 l f l ps l Th se f h l l cell l g f polyhed l
 l l cul l l som pl ces th cell sep ted by r r w
 g p t r ed l f cell la br ides suggest g th l mph-ca l cula
 f j mo f hel m When compressed th cell ppe fl ttened
 l curv d l out h h A few l th se cell es h l m l ed

Sect f m ll part f h pe m h k g h g tl
 h d tru t (F g 1 2) Th psul th k d d co f th
 gul f m flae f hb so I som pl t ll f
 d ll d pl cell th ce f h h may be see mall blood
 vessel f h ll d th l m Af w f th se polym pho-
 l l k cyt W d sep f fib t vt l a d f m th
 cap f th l ce f th gl d l f sc l f fib t s
 d ss h rva! b t ee h l g b d ry d t Th
 fib so part hy! d t ct l d part composed f
 fibre bet ee h h ca be se h l g d l f th co t ss
 cell At l pl f d y g ft ll ll h l g p to-
 pl m p ce se Sca t d th gh th fb th bo t d f

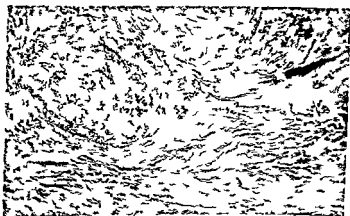


Fig 1 2—(La fib g) (C = III) A lymph f ll l ppea
 l f d d b d se fib t ss \ hy d bl l
 po) (Ph m cr pr ph)

f se d sc bed ll f ll lymph ex d pl m ll
 scatt f w ll d fi d lymph f ll l d w d ly separa d
 ant f gl d f
 Th thy d pa hym pe pec ll j be h h caas l b
 Lo bef d t a d pth I th se f d hy l l
 mpa tly pr ped t f m l b l 3 t 10 mm diam t M f h se
 coll d L mph od l h po th l b l d d f
 l myhotyt d pl m cell f d w h th l bul bo h l
 bet th p h lal ll d lso th l m f m y l h
 p h l l l g f h l h dappea d ly part b ung
 pl ced b fib m g f m m ry ll Th ral b l
 fbro = t m so b d d mpa be h d ff lt
 d gu h d f m h t l b l ha d

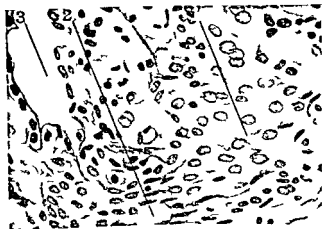
Th il f lly ph d l m t b l t th cap l b t
th y f d th gh t th bst f th pe m t l t d
ft se l h sq t m t f t f ce Th se f l l
pe lly p t th m g f th g bl thy d l b l
S h f l l f m 100 t 900 m d m t w th lymph yt t th
t d b d t pl m ll th pe ph l zo A t g m l
t l k g
Th bl od pply pl t f l b t t t k g f t th p th
l g p t O ca lly sel w th th k d ll se R ly
som f th sect pecul g p f p th l l ll t d (Fg
173) Th se ll t p m t f t d ppe t h pe t d
th ly light h g th m d t f th fl mm t ry t f m t
g th d g thy d t S h t m y b f d
lymph l l (Fg 13) t l b l sept m th th thy l
l l l A rul tl t solt ry (Fg 173) b t th y m y b p d



Fig. 13—(see III) l l h l cell est (1) lymph f l l A t
h l ge cell d l sem t m mbra (h gh po)

se l l f d m scq f l l se l low l ed gr ps
f h se f l l l h h cap l th ce t l
f h l l l l e Th est a h pe f m d l al m ses
g l l l hed g ps h th k l l p l ga so They m s
0 00 l Th p h lual cell se l d p h l
h l f l l f l base ml Th h e
l f l poul These p h l l cell l g d polyhed l
h l ul l l sem pl ces h cell re sep ted ly rr w
f l med l f rcell la l d e sugges g th l mph-ca lcula
f l p u bel m When compressed h cell ppe flattened
l curved l h l A few f hese cell es h l m na l ed

by b d l y l d cal cell O l r g t h l m p p e a r s t
 posse d t l d g y f m t Th se pecul cell t r p d
 m t f h po tb an hual body d sc bed by Get w H re
 f d th sold cell t ep se g h gl d l p hym f th po t
 b h l body (F g 173) d h h l l t th d t p se t g th
 sor y (F g 174) Th m d t p g th g l ph r y n
 ge l po h h t be f d



F g 174—(Case III) C y t (l d) d d (3) f th po tb an h l
) m (h gh po)

Since the publication of Case III 1975 the evidence has been two notable contributions on Riedel's struma Shaw and Smith 1975 and Smith and Clute 1976. There have also been reports of follicular carcinoma Hahn and Grunb 1975, Schultz 1976, Tucker and Gert Matth 1977, and Miller Guv B b e and He t 1978 unite in the publication of a single case.

The authors intend to follow the currently and generally accepted view on Riedel's struma concerning the idea of a peculiar chronic inflammatory fibroblastic reaction.

A different concept of this type of struma advanced by Williams and Pea 1975, the classification of it as unusual and based on the various histological findings and function and anatomy. The clinical Riedel's struma and the rapid growth of hyperplastic gland (subhyaline lymphoid nodules).

[myxedematous] goiter) and state that the thyroid glands are like adenoid goiters which have lost their lobulation. Thus we have the first definite assertion that Riedel's struma is related to general thyroid pathology. These authors maintain that the late lesion is not like the atrophy following Graves' disease, ligature or ray therapy, but is like that of myxedema. The progressive stage is a secretory hypertrophy, but the epithelium shows chromatin at a minimum indicating exhaustion. The lymphocyte reaction is proportional to the failure of the hyperplastic tissue to provide normal secretion. The fibrosis is not that following involution according to Shaw and Smith. According to Williamson and Pearce it is a train fibrosis. The analogy to cirrhosis of the liver and to chronic inflammation of salivary gland has been pointed out by several authors.

It has remained for Lason (1928) to venture the opinion which he strongly affirms that the structural changes in exophthalmic goiter, myxedema, and Riedel's struma are successive phases of an identical inflammatory process, but he adds that the sequence does not always follow.

There is agreement among the various authors (Shaw and Smith, Smith and Clute, Williamson and Pearce, and Meeker) on one point and that is that Riedel's struma occurs in glands of low vitality that is glands showing physiologic inefficiency. This phase of the question is in line with the embryonal bodies found in Case III. Such postbranchial bodies had previously been found in adults only in cretins with myxedema.

From the embryologic standpoint also we may find the explanation of the extracapsular extensions seen in many of these cases. We will consider them in part at least as coincident with dispersed thyroid nodules. Thyroid nodules scattered in the fascia of the neck are not uncommon in man as pointed out by Marine et al., and it is well known that these nodules arise in the general fascias of the thyroid gland proper.

Finally we have reported 2 new cases and reviewed a previously reported case of Riedel's struma. The 2 new cases illustrate and emphasize early and progressive phases of this puzzling thyroid lesion, and call the recurrence in the second

case. The extracapsular extensions in the second case are interpreted as coincident in evolution of a primarily diffuse type of thyroid gland. The postbranchial embryonal elements found in Case III also point to morphologic irregularities. Riedel's struma is a thyroid enlargement which clinician, surgeon and pathologist may all err in diagnosis. The clinical symptom complex but a hard tumor mass and low basal metabolic point to Riedel's struma.

Anesthesia and Operation—In the treatment of a surgical condition of the thyroid there is embraced three well defined periods—the preparation of the patient for operation, the operation and the postoperative treatment. In conditions not associated with thyrotoxicosis a prolonged preoperative treatment is not required nor the giving of iodine preoperatively indicated. Of great importance in all thyroid surgery is the selection of the type and method of administration of the anesthetic. For the last fifteen months we have employed rectal anesthesia as devised by Gwathmey for all cases of hyperthyroidism of the Graves disease type. Occasionally we also employ rectal anesthesia for the thyrotoxicosis of so-called adenomatous goiter. In all other goiters with the infrequent exception where local anesthesia is used we employ ethylether and the use of chloroform.

In the use of talc, the physician is told to have the very active absorption of the esthetic and which has been thoroughly treated and medicines patients in the clinical efficiency. The evaluation technique of the G. H. Smith, Chief Resident, is carried out by Mrs. Ada M. Smith, Chief Resident, at the New York Hospital, which follows.

A definite hour for the beginning of the present term is fixed upon a date, if the utmost importance of the present command upon the body to operate in the future. The night before the present takes place, the body is to be at 5 1/2 to 5 3/4 P.M. The present is to be held at 6 P.M. the day following. At 1 A.M. on the morning of the day of presentation, the main body follows in the evening by the irrigation of clear water until the end.

flow is clear. This usually requires from 6 to 10 gallons of water given through a bivalv rectal tube. The enema and colonic irrigation should be completed by 9 A. M. At 9:15 A. M. morphin gr $\frac{1}{8}$ or $\frac{1}{4}$ given depending upon the body weight stature and age of the patient. The patient is kept in bed and absolute quietude is insisted upon from this time on. At 12 o'clock noon chloroform gr xv ether \mathfrak{z} ij olive oil \mathfrak{ss} is given as a retention enema through a tube that has been inserted into the rectum a distance of 8 to 10 inches. The rectal tube is allowed to remain *in situ* and is clamped to prevent reflux. At 12:50 P. M. a second dose of morphin gr $\frac{1}{8}$ or $\frac{1}{4}$ given hypodermically the dosage to be determined as indicated above by weight stature and age of the patient together with an estimation of the reaction obtained by the previous dose of morphin as given at 9:15 A. M. With this morphin is also given 1-150 of atropin hypodermically. The patient is then placed in a left Sims position and at 1 P. M. the following mixture is prepared and given per rectum olive oil \mathfrak{z} ij ether \mathfrak{z} iv and paraldehyd \mathfrak{z} j. One ounce of this mixture for each 20 pounds of body weight is introduced through a funnel connected with the tube that has already been placed in the rectum.

Some patients complain of cramping burning sensation and a desire to evacuate the bowel. To relieve this condition it is advisable to stop the flow of the solution and by lowering the tube allow the fluid to escape without losing any of the mixture. When the required amount has been given the tube is again clamped and allowed to remain in the rectum throughout the operation.

If the patient has not become narcotized by the time the mixture is put in the anesthetic allow the patient to rebreathe freely with a Bennett inhaler. This must be accomplished without the knowledge of the patient that a syringe has touched the face. This rebreathing prevents any loss of the anesthetic through the expired air. It may be necessary to supplement the rebreathing by a small amount of ether inhalation which can be delivered while the patient is being prepared on the operating table. Once the operation is started further anesthesia is un-

case The extracapsular extensions in the excised are interpreted as coincident involvement of a primarily diffuse type of thyroid gland. The postbranchial embryological remnant found in Case III also point to morphologic irregularities. Riedel struma is a thyroid enlargement in which clinician surgeon and pathologist may all err in diagnosis. The signs no symptom complex but hard tumor mass and low basal metabolism point to Riedel struma.

Anesthesia and Operation.—In the treatment of any surgical condition of the thyroid there is embraced the well defined periods—the preparation of the patient for operation, the operation and the postoperative treatment. In connection not associated with thyrotoxicosis a prolonged preoperative treatment is not required nor is the giving of oxygen artificially indicated. Of great importance in all thyroid surgery is the selection of the type and method of administration of the anesthetic. For the last fifteen months we have employed ethyl chloroform as a sedative and by Gwathmey for all cases of hyperthyroidism of the Graves disease type. Occasionally we also employ ethyl chloroform as a first thyroidectomies of so-called adenomatous goiter. In all other connection with the infrequent operation where local anesthesia is used we employ ethylene as the anesthetic of choice.

In the use of ethyl chloroform the anesthetist should have the very active co-operation of the anesthetist and on who has been thoroughly trained and combines patience and technical efficiency. The exact technique of the Gwathmey ethyl chloroform is carried out by Miss Adeline Marie Smith, Chief Resident Anesthetist at the New York Postgraduate Hospital is as follows:

Admit the patient for the beginning of the operation and determine upon and this of the utmost importance that the operating room and surgeon be ready to operate on the scheduled time. The patient before the patient is taken to the operating room. The patient is put to bed at 5:30 to 6:30 at 8 P.M. The patient is scheduled to be in at 2 P.M. the day following. At 7 A.M. in the morning of the day of operation an anesthetic is given followed one hour by a colon cathartic of the warm water until the return

flow is clear. This usually requires from 6 to 10 gallons of water given through a heavy rectal tube. The enema and colonic irrigation should be completed by 9 A. M. At 9:15 A. M. morphine gr. $\frac{1}{6}$ or $\frac{1}{4}$ is given depending upon the body weight, stature and age of the patient. The patient is kept in bed and absolute quietude is insisted upon from this time on. At 12 o'clock noon chloroform gr. xv ether \mathfrak{v} olive oil \mathfrak{ss} is given as a retention enema through a tube that has been inserted into the rectum at a distance of 8 to 10 inches. The rectal tube is allowed to remain *in situ* and is clamped to prevent reflux. At 12:50 P. M. a second dose of morphine gr. $\frac{1}{6}$ or $\frac{1}{4}$ is given hypodermically, the dosage to be determined as indicated above by weight, stature and age of the patient together with an estimation of the reaction obtained by the previous dose of morphine as given at 9:15 A. M. With this morphine is also given 1/150 of atropine hypodermically. The patient is then placed in a left Sims position and at 1 P. M. the following mixture is prepared and given per rectum: olive oil \mathfrak{v} ether \mathfrak{iv} and paraldehyde \mathfrak{v} . One ounce of this mixture for each 20 pounds of body weight is introduced through a funnel connected with the tube that has already been placed in the rectum.

Some patients complain of cramp, burning sensation and a desire to evacuate the bowel. To relieve this condition it is advisable to stop the flow of the solution and by lowering the tube allow the fluid to escape without losing any of the mixture. When the required amount has been given the tube is again clamped and allowed to remain in the rectum throughout the operation.

If the patient has not become narcotized by the time the mixture is put in the anesthetic bowl the patient to rebreathe freely with a Bennett inhaler. This must be accomplished without the knowledge of the patient that anything has touched the face. The rebreathing prevents any loss of the anesthetic through the nasal air. It may be necessary to supplement the rebreathing by a small amount of ether inhalation which can be done easily while the patient is being prepared on the operating table. Once the operation is started further anesthesia is un-

case. The extra apical extensions in the second case are interpreted as coincident in development of a primarily diffuse type of thyroid gland. The postbranchial embryonal remnants found in Case III also point to morphological irregularities. Redell's struma is a thyroid enlargement which clinician, surgeon and pathologist may all agree in diagnosing. There is no symptom complex but a hard tumorous and low basal metabolic rate point to Redell's struma.

Anesthesia and Operation.—In the treatment of any surgical condition of the thyroid the essential is three well defined periods—the preparation of the patient for operation, the operation and the postoperative treatment. Indications not associated with thyrotoxicosis are prolonged preoperative treatment is not required nor is the giving of digitalis prophylactically indicated. Of great importance in all thyroid surgery is the selection of the type and method of administration of the anesthetic. For the last fifteen months we have employed ethyl anesthesia as described by Gwathmey for all cases of hyperthyroidism of the Graves disease type. Occasionally we also employ ethyl anesthesia for the thyrotoxicosis of solid adenomatous goiter. In all other goiters with the notable exception of when local anesthesia is used we employ ethyl as the anesthetic of choice.

In the use of ethyl anesthesia it is essential to have the very active cooperation of the anesthesiologist and one who has been thoroughly trained and combined patience and technical efficiency. The technique of the Gwathmey ethyl anesthesia is carried out by Miss Ada Maria Smith, Chief Resident Anesthesiologist at the New York Postgraduate Hospital.

A definite hour for the beginning of the operation is determined upon and that of the utmost importance that the operating room and surgeon be ready to operate on schedule time. The patient before operation takes 10 grains of glycerol of iodine in 5 grains of sugar at 8 P. M. The patient is bedded to bed at 2 P. M. the day following. At 7 A. M. on the morning of the day of operation an assistant nurse enters the room and by 10 A. M. the patient is awake until the turn

thyroid cartilage down to the notch. The flat ribbon muscle of the infrahyoid group are elevated or divided. This step may or may not be omitted depending upon the operative exposure the size of the thyroid and the extent of adhesions to be separated. In this case it will be necessary to divide the muscles. We divide the muscles at the upper third so as to not injure the descending hypoglossal nerve which enters the muscles at their lower third. By inserting a Tarker retractor and pulling outward on the right sternomastoid we expose our field rather well. We have a definite new growth surrounding the trachea and extending well down beneath the manubrium. The mass is making distinct pressure on the trachea deflecting it toward the left side and producing a relative obstruction to the tracheal lumen. It seems to be like plaster of Paris cemented around the trachea posteriorly even down around the esophagus. Upward and to the right we observe a second mass somewhat larger approximately 1 cm in diameter. It is difficult to determine what is thyroid tissue and what is not as there is an extensive invasion into the sternomastoid and infrahyoid groups of muscles. We divide the infrahyoid group of muscles also on the left side. With scalpel dissection we excise the tumor. Aside from bleeding the mass on the upper right side is removed without any particular difficulty. The mass over the trachea evidently is invading the trachea. For safety I will divide the mass from above downward in the median line as a result the tumor is in two portions one to the left and one to the right of the trachea. The larger fragment can be displaced to the right side. This allows the trachea to be clearly identified and exposed and thereby protected from direct injury by reason of the dissection being carried out from the midline outward and upward on each side away from the trachea. We do not know whether the recurrent laryngeal nerves are invaded by this mass. We should judge that they are not because there has been no history of hoarseness or aphonia. The right mass is now removed and in a moment the left mass will be free. The entire tumor has been removed and all the clamps controlling bleeding are in position. The patient has stopped breathing. There has been no pre-

necessary. The length of time that patients have been held under this type of anesthesia has varied greatly but in one case an anesthesia of one hour and forty five minutes was obtained which should give ample time for almost any type of operative work. Upon the completion of the operation the tube which has remained in the rectum is unclamped and the mixture if any is allowed to drain off. This is measured and the amount withheld again deducted from the original amount. As soon as the patient is returned to bed a colonic irrigation of cold water is given immediately and that is followed by a retention enema of olive oil 30 to 50 cc.

Rectal anesthesia requires a very carefully detailed plan properly coordinated for its success. I believe 4 out of 5 cases are able to do the thyroid operation without the patient having any knowledge as to when it is to be performed or any remembrance of the operation until she awakens after its completion.

In the case of this patient today ethyl ne is highly satisfactory and we place the patient in reversed Trendelenburg position to an angle of about 45 degrees with the head tilted with a small sand bag under the shoulder.

The incision on the neck is placed 1 cm higher than the position at which you desire the permanent scar to be for after the removal of a moderately enlarged thyroid the contraction of the scar will tend to bring it approximately 1 cm below the level at which the incision was originally made. This is an important if a necklace or a string is fastened to be used as the scar. The incision begins at the anterior border of the left sternocleidomastoid muscle with a light concave upward

tending across the neck to the opposite side of the anterior border of the sternocleidomastoid and in the midline lying about 3 cm above the suprasternal notch. The skin is incised and platysma is reflected upward and backward. The bleeding points in the muscles overlying the thyroid gland are tied with No. 1 plain catgut. The vessels of the skin are clamped and the clamps are left attached until the conclusion of the operation. The infrahyoid muscle is divided in the midline between the

on the chart that immediately following the operation the voice sounds were normal.

We will place this patient in a sitting position allow fluid by mouth and give him morphin gr or gr every four hours or as often as the occasion requires for pain or restlessness. The tracheotomy tube will be aspirated by means of a suction apparatus every four hours and in order that this may be carried out regularly it is necessary to have a special nurse give her entire and undivided attention to this patient. We shall also give him 500 c.c. of tap water to which has been added 50 grams of glucose every six hours so that he take by rectum 1500 c.c. of ordinary water a day. In the first Murphy proctoclysis we will add 4 c.c. of Lugol's solution. It is our custom to give Lugol's solution about 60 mm. per day for the first five days after any thyroid operation. During the first twenty four hours it is wiser to give it by rectum as occasionally Lugol's solution causes the patient to vomit.

This patient required no iodine preoperatively as his thyroid secretion was not influenced by his disease. We feel that the giving of iodine in thyroid disease has very definite indication and should not be used indiscriminately.

In the postoperative management of all types of thyroid carcinoma iodine has come to occupy a large place. Our own experience seems to suggest that after any goiter operation iodine is indicated. The administration of iodine may be by mouth or rectum hypodermically or intravenously and any preparation is as useful although our preference is for sodium iodide in glystering solution and Lugol's solution in prophylactic and postoperative iodine therapy.

At this time certain conclusions can be made about iodine and goiter: (1) Iodine is a drug and its use in goiter therapy should be strictly within the hands of the physician. (2) Iodine is preeminently useful in goiter prophylaxis it is immaterial how it is administered or in what form provided the dose is small and the treatment intermittent. (3) It is useful in stabilizing function in the colloid type of goiter but care should be exercised to eliminate adenoma in the diagnosis. Adenomata are infrequent

larynx stridor of the larynx in the breathing sounds to indicate that the nerve supply of the larynx has been injured. We have a case of tracheal collapse. With an Allis clamp on either side we will pick up the third tracheal ring below the cricoid cartilage and make a stab wound into the trachea and insert a tracheotomy tube. (Patient coughed and recommenced breathing.) I do not know what mechanical or nervous response is for what it takes to be a tracheal collapse but I shall leave the tracheotomy tube in place until I am quite sure that all danger of tracheal obstruction is passed. The blood vessel is now ligated with No. 1 plain catgut and the divided muscles sutured with No. 2 chromic catgut. The inferior thyroid muscles on each side are sutured in place. A small wick of iodoform gauze is laid in the lower end of the wound beneath the manubrium. We will undoubtedly have some infection in this space and I think the protection afforded by the iodoform gauze will prevent any anterior mediastinitis. It will not be necessary to drain either the right or left thyroid fossæ. The skin is brought to either with a vertical clip on either side up to the tracheotomy tube. We have found that vertical clips give us a much finer cosmetic result than a suture which we have used. It is essential that the individual lips be not compressed too tightly and that all should be somewhat elevated on the third day and all out before the fifth day otherwise the pinpoint tremors of the lip are very apt to leave small punctate scars.

The sterile dry dress is applied and we shall disconnect the ethylene and ask the patient to speak. It is essential that we not let the vocal cords immediately after the operation as occasionally a patient is unable to do so after a normal vocal sound. I think I will postpone when we go to a postoperative check. This patient until we leave the tracheotomy apparatus with a fine will probably not be able to phonate and count fifth block of column of passage through the larynx. I place my hand over the tracheotomy tube and ask the patient to say "Y" and "No." You observe that the sounds are full and clear. I will make a note.

scar gives him practically no trouble. He has undergone x ray treatment with Dr. Meyer of the x Ray Department of the New York Post Graduate Hospital and we believe the prognosis is good. At the same time we are giving him 1/10 grain of thy-

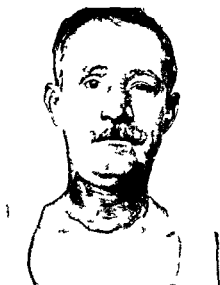


Fig. 175.—Portrait photograph of patient three months after operation.

roid extract three times a day. His basal metabolism since the operation is normal and our opinion is that with his x ray therapy we can prevent regrowth and with thyroid extract prevent the development of myxedema (Fig. 175).

before twenty year of age (4) It is distinctly indicated as a preventive measure either in or out of regions of high outer incidence during pregnancy and lactation and the measure (5) It is distinctly indicated for a short period of time but without a gap as a preoperative measure in Graves disease (6) It is indicated as a postoperative measure after all types of outer operations (7) Its use in adenomata is variable but pre-eminently dangerous as initiating hyperthyroidism in non-toxic adenomatous goiters (8) When iodine is administered without proper restrictions as to the conditions for which it is indicated its use carries with it the danger of producing an iodine hyperthyroidism

The pathological report of the tissue removed extremely interesting the large tumor measured $3 \times 3 \times 5.5$ mm and covered with a pink fibrous capsule together with much connective tissue. The consistency is firm but not particularly hard. On section it is a beefy colored partly hemorrhagic. The two sections removed from the right and left sides of trachea measure $3 \times 3 \times 3$ and $5 \times 3 \times 2$ respectively. In these specimens the are all varieties of tissue from gray to flesh to beefy the area of paler and well vascularized. Pathologic diagnosis is Riedel's struma chronic trinit. Dr. Alte the Pathologist makes the following note. The trachea fetus is the eucrine. The noticeable difference from the peritoneal specimen the increase of stroma and numerous mitotic figures. It is distinctly a later stage. The no evidence of malignancy. Ravert treatment and further observation would be of great value.

At the end of forty eight hours the tracheal tube was removed the aperture loosely plugged with some iodoform gauze and the patient could carry on a normal conversation without dyspnea or stridor. The voice sounds clear without hoarseness although not strong. The patient maintained an uncomfortable condition with his highest temperature 101°F and his greatest pulse rate 110 and was discharged on October 20 1928 one week after his operation.

The subsequent course of this patient has been uncomfortable. We have observed him from week to week. His temperature

scar gives him practically no trouble. He has undergone x ray treatment with Dr. Meyer of the x Ray Department of the New York Post Graduate Hospital and we believe the prognosis is good. At the same time we are giving him 1/10 grain of thy-



Fig. 175.—R. I. Strum. Photograph of patient three months after second

thyroid extract three times a day. His basal metabolism since the operation is normal and our opinion is that with his x ray therapy we can prevent its growth and with thyroid extract prevent the development of myxedema (Fig. 175).

DIVERTICULUM OF THE ESOPHAGUS TWO STAGE OPERATION

Diverticulum of the Esophagus Mechanism of Production
Progressive Character of the Lesion Development of a Vicious
Circle Location and Symptoms Appearance and Chronicity
Operative Technic Interval Between Stages Dangers of Sup-
purative Mediastinitis

History—The patient I am presenting is a man sixty-one
years of age married born in Germany has resided in the state
of New York for the past forty years. The patient's family
history is negative. His personal history is not noteworthy for
any condition other than the present complaint. His present
illness began with difficulty in swallowing about eleven years
ago. In the beginning he noticed a sort of catching or holding
of his food just below the midpoint of the neck. For the last
eighteen months his distress has become continuously and per-
sistently worse and from time to time he has vomited back his
food which seem to come from somewhere in his neck. The
malidity of his swallow has become increasingly more marked and
the patient has found that fluid will go by better than solid
food and as a result he has been unable to eat meat for the past
three years. He has lost 40 pounds in weight in the last two
years.

The physical examination reveals a man with rather an
extreme degree of emaciation and presents the usual evidence
of loss of weight. There is a well-defined anemia present. Ex-
amination of the chest and heart is negative. Abdomen is nega-
tive on inspection and palpation. Roentgen ray examination
with barium meal shows a diverticulum of the esophagus. The
diverticulum apparently arises from the posterior and left
lateral aspect of the esophagus at about the level of the cricoid
cartilage. The sac extends inferiorly and backward and some-

tion. This muscle as you may recall encircle the esophagus and cricoid cartilage and if the cricopharyngeal muscle is in spasm the pressure of deglutition produces a herniation of the mucous and submucous layer between the muscle fibers and a true pressure diverticulum of the esophagus is developed. It is noteworthy that the diverticula of the cervical esophagus are distinct herniation consisting only of mucous and submucous layer. In this peculiarity they stand alone and distinct the only



exception in diverticula of the bladder which are produced by muscular mechanism and also exhibit only mucous and submucous layers. Diverticula of the small and large intestine always contain the regular coats of the intestine and consist of mucous submucous and muscular layer. If the cricopharyngeal muscle is held in spasm and remains unrelaxed it presents an almost impassable barrier to the movement of the bolus down and from the movement a diverticulum in this situation is developed.

what to the left between the posterior wall of the esophagus and the anterior surface of the cervical vertebra. When filled with barium the diverticulum extends well below the upper level of the manubrium and in its growth equals approximately the size of a Bartlett pea (Fig. 1611).

The development of diverticula of the esotro-intestinal tract is not infrequent and they may occur at any portion of



Fig. 16—Lateral ray of diverticulum of esophagus

the out tube. Diverticula may be divided into Pericardic diverticula, tracheal diverticula, maligant and possibly coexistent diverticula. They form in the neck area and are usually due to pressure and sprout from a very small area of the posterior surface of the esophagus at the junction of the pharynx and the esophagus and almost directly opposite to the cricoid cartilage.

Dr. Chas. J. Jackson believes that inco-ordination of the cricopharyngeal muscle is the etiological factor in their produc-

tion. This muscle, as you may recall, encircle the esophagus and cricoid cartilage and if the cricopharyngeal muscle is in spasm the pressure of deglutition produces a herniation of the mucous and submucous layer between the muscle fibers and a true pressure diverticulum of the esophagus is developed. It is noteworthy that the diverticula of the cervical esophagus are distinct herniations consisting only of mucous and submucous layers. In this peculiarity they stand alone and distinct the only



Fig. 1.—1

Diverticulum of esophagus

exception in diverticula of the bladder which are produced by a valvular mechanism and also exhibit only mucous and submucous layers. Diverticula of the small and large intestine always contain the regular coat of the intestine and consist of mucous, submucous and muscular layers. If the cricopharyngeal muscle is held in spasm and remains unrelaxed it presents an almost impenetrable barrier to the movement of the bolus downward. From the moment a diverticulum in this situation is developed

there is a tendency for pressure to give a distended continuous enlargement with the result that as the diverticulum enlarges the esophagus develops a secondary and lateral compression of the esophagus below the diverticulum orifice. This adds a secondary obstruction to the advanced bolus and establishes a vicious circle (Fig. 18).

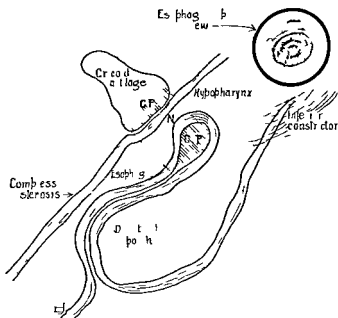


Fig. 18—Schm. of D. Ch. al. J. lso. heery. f. h. f. l. f. h. l. g. f. p. l. d. r. t. l. m. Th. ch. f. f. l. l. g. f. h. coph. ryng. l. m. scl. (CP) l. u. ch. m. ally. p. l. l. h. co. d. cart. l. g. ba. k. ga. t. h. p. m. intaining. in. health. t. l. f. h. soph. ge. l. mo. th. (N) Th. b. rmal. l. g. f. t. rise. h. h. onco. ph. ryng. e. f. l. l. th. pp. oa. h. f. h. bol. p. pell. d. b. h. po. f. l. co. ra. t. f. th. f. co. str. i. t. th. po. f. l. sq. m. scl. Th. structural. f. t. r. s. d. m. ra. d. by. Mosh. d. btl. f. q. l. g. rea. m. port. ce. Th. dra. g. l. so. ll. ra. h. seco. dary. comp. t. wh. h. l. g. h. th. largem. f. h. po. ch. d. h. sed. d. gl. tit. press. co. tu. tes. h. ci. ci. l. h. h. h. bl. se. f. dy. eph. gia. f. d. scomf. rt. d. pe. d. l. h. esoph. gosc. p. w. h. n. ph. ry. geu. m. scl. (CP) co. ce. led. d. h. m. cosa. bet. ee. h. d. verticul. po. h. h. n. bel. w. d. h. l. l. k. fi. f. h. bd. verticul. soph. gu. h. n. th. p. f. th. cul. f. l. d. f.

The complications that may be expected in operation for diverticulum of the esophagus are (1) Aspiration pneumonia (2) mediastinitis (3) hemorrhage (4) fistula (5) recurrence. In Stetten 60 cases the operative mortality was 16.6 per cent and it is interesting to recall that Zenker and Siemsen in 1871 expressed the hope that esophageal diverticula might be cured by surgery. Sepsis and pneumonia are the most frequent causes of death. Pneumonia can be to a large extent prevented by using a local anesthesia or ethylene gas by drainage of the diverticulum of its putrid contents through an esophagoscope and by avoiding pressure on the diverticulum during the course of the operation whereby the septic material might be forced into the lung. If esophageal leakage occurs it will follow along the fascia in front of the vertebral column and advance into the posterior mediastinum a complication of great lethal potentiality.

Hemorrhage should be obviated during the course of the operation and by the absence of drainage tubes. Fistula and recurrence are fortunately very rare and to a large extent can be prevented by a precise operative technique and the use of the Levine tube after the excision of the diverticulum.

Diverticulum of the esophagus is essentially a disease of a middle life. In Julius' series of 54 cases the average age at operation was 45.5 years and the average duration of symptoms previous to operation 19 years. The symptoms are usually clear cut and distinct although the differential diagnosis involves a distinction between carcinoma, stricture and dilatation of the esophagus due to cardiospasm. The x-ray examination and esophagography make the diagnosis certain and relatively easy. The history is so strongly suggestive of the condition that it is difficult to doubt the diagnosis. The symptoms usually begin in childhood with a hoarseness in the throat and a slight suggestion of tracheal irritation. A cough likewise develops. After a variable period of time the patient is conscious that the food material sticks in the throat and there is regurgitation late in the evening. Some of the patients learn to express the contents of their diverticula by pressing upon the sac at the root of the

on either the right or left side and with a gurgling noise they eructate the contents of the diverticulum. With the enlargement of the diverticulum the obstruction to the passage of food becomes more marked and loss of weight becomes an important factor. There may also be some dyspnea. The difficulty in swallowing is a constant symptom and is present from the beginning until the patient comes to operation. In some cases the patient can pass a stomach tube and feed himself but in the majority of cases by reason of the lateral compression of the diverticulum on the esophagus the passage of a soft flexible tube into the stomach difficult or impossible. In the case here reported the Levine tube before operation invariably entered the diverticulum and one of my associates spent the better part of a day trying to pass a duodenal tube into the stomach.

Operation—First Stage.—The patient is anesthetized with ethylen glycol and placed in the reverse Trendelenburg position such as we are in the habit of using for operation upon the neck and thyroid gland. The head is turned somewhat toward the right side and our incision begins at the level of the hyoid bone on the left side and follows the anterior border of the sternomastoid muscle downward curving in toward the median line and terminating at the suprasternal notch. The pretracheal fascia and muscles are divided. We come upon the lend belly of the left omohyoid muscle and divide it. The left lobe of the thyroid is exposed. Beneath it the trachea is elevated and retracted toward the midline with a Parker retractor. A second Parker retractor is inserted on the right side of the thyroid gland and esophagus and to the left. By a careful and bloodless dissection with careful exposure of the well exposed and so identify the left auricular nerve on the left side between the trachea and the esophagus. In the depth of the wound you will not find a rather fleshy gray colored tissue which I take to be the left interlobar leaf of the esophagus of the diverticulum. There is very little if any surrounding inflammation and we will strip the interlobar leaf of this tissue with an Allis clamp. Beneath the dissection the elevated diaphragm

diverticulum of the esophagus. The sac is readily dissected from the loose areolar tissue in which it lies. It readily comes forward. We see that as we free the diverticulum and approach the midline behind the esophagus the sac becomes contracted into a neck and arises apparently to the left of the midline and almost directly behind the cricoid cartilage. We will leave the diverticulum undisturbed except for exerting traction upward and outward to the left. We suture its external surface to each



Fig 10—Diverticulum placed in the neck. Seven days after first operation.

succeeding muscular layer from within outward. About three interrupted sutures of No. 3 chromic catgut will hold the diverticulum horizontally and allow it to close off the mediastinum. The closing off of the superior thoracic aperture is essential as any seepage of the contents of the sac will inevitably result in a mediastinitis with a very high mortality rate. The skin is closed around the diverticulum with Michel clip. The final result is that the distal two-thirds of the diverticulum is lying entirely free on the left side of the neck at about the midpoint of the left sternocleidomastoid muscle (Fig 10). In planning our cutom we will let

the patient came out of his anesthesia and ask him to say Yes and No. The patient responded the vocal sounds are clear and no damage has been sustained by the recurrent laryngeal nerve.

By the operative fixation of the diverticulum to the side of the neck the orifice of the sac is lower than the fundus. As a result the patient should be able to swallow almost immediately

without any reflux of fluid or food. Occasionally the diverticulum becomes distended with air and on compression the diverticulum from the outside the sound of gas passing from the diverticulum into the esophagus plainly audible.

The patient will be able to swallow water by mouth at once. In addition we will give him 500 cc of tap water containing 50 grams of glucose by rectal drip every six hours. Morphine-grain by hypodermic every four to six hours for pain or restlessness. At the end of the forty-four hour if the patient is swallowing normally we will give him full soft diet and at the end of a week or ten days the second stage of the operation will be performed. In the interim we will attempt to build up his nutritional condition. We purpose to give him a daily intake of from 3000 to 4000 calories and reduce from 3000 to 4000 cc of fluid daily. The patient has undergone prolonged starvation and has wasted his resistance small and helpless with tenderness prolonged edema extensive respiratory distress. At the end of a week or ten days we are confident that all of the distress that we have exposed to deal with has subsided and that the upper esophageal

intestinal space will be completely loaded off. It is likely that a fixation of the diverticulum of the esophagus by the total fixation of the stomach to the abdominal wall is the only method that attended the one-stage operation. The purpose of the first stage of the operation is to make the diverticulum distensible if the medical treatment that the condition presents even in the presence of solution we are unwilling to risk failure of the mediastinum.

The patient is positioned at the upper waist level of the fifth day after operation on the sac was closed to allow the escape of air which kept ballooning up the diverticulum. The patient was undisturbed for three months.

Second Stage—One week ago today the first stage of an operation for diverticulum of the esophagus was performed. We now propose to excise the diverticulum and invert the neck or stump at the same time to place a Levine tube through the nose down into the stomach in order to feed the patient and maintain complete physiologic rest of the esophagus. At the present time you will observe that the diverticulum has been muralized on the left side of the neck (Fig. 179). We begin our operation by making a circular incision through the skin around the diverticulum and excising the previous operative incision. By careful dissection we mobilize the sac down to its neck. A Parker retractor applied to the right side of the wound retract the thyroid and trachea and esophagus somewhat to the right. A Parker retractor in the left side of the wound retract the carotid sheath and vessels to the left. By making traction outward and upward on the diverticulum we have sufficient tension upon the neck of the sac where it communicates with the esophagus to define clearly the esophageal wall. A purse-string suture of No. 2 chromic catgut is now placed around the neck of the sac much after the technic employed in the inversion of the stump of the appendix. The purse-string is completed. There is a little technical trick about this purse-string suture. You hold the two ends of your purse-string between the thumb and first finger of your left hand and the loop in the little finger at approximately 6 o'clock and 12 o'clock on the watch face. The neck of the sac is divided between two points of traction and it is inverted with an appendiceal stump rather than that of the sac in this manner. I now have the purse-string suture with completed loop in my little finger at 12 o'clock and the two ends in the thumb and first finger at approximately 6 o'clock. Then I divide the sac clamped and divided by the loop with a suture. The clamp and diverticulum are removed (Fig. 180) and the sutured neck of the esophageal stump is ready for inversion. Maintaining traction on the loop and the two ends of the purse-string the neck is inverted and simultaneously

the patient come out of his anesthesia and ask him to say Yes and No. The patient responds the voice sound are clear and no damage has been sustained by the recurrent laryngeal nerve.

By the operative fixation of the diverticulum to the side of the neck the orifice of the sac is lower than the fundus. As a result the patient should be able to swallow almost immediately without any reflux of fluid or food. Occasionally the diverticulum becomes distended with air and on compressing the diverticulum from the outside the sound of air passing from the diverticulum into the esophagus is plainly audible.

The patient will be allowed water by mouth at once. In addition we will give him 100 cc of tap water containing 10 gram of glucose by rectal drop every six hours. Morphine grain 1/2 hypodermic four to six hours for pain or restlessness. At the end of twenty-four hours if the patient is swallowing normally we will give him full soft diet and at the end of a week or ten days the second stage of the operation will be performed. In the interim we will attempt to build up his general physical condition. We purpose to give him a food intake of from 3000 to 4000 calories a day and from 3000 to 4000 cc of fluid a day. The patient has undergone prolonged starvation he is lethargic, reduced his resistance, small diminished ability to withstand either prolonged or extensive surgery practically nil. At the end of a week or ten days we are confident that all of the trouble that we have exposed today will have healed and that the operative medical attention will be completely closed off. It is only by taking care of the diverticulum of the pharynx by this operation that we have eliminated the high surgical mortality that attended the one stage operation. The purpose of the first stage of the operation is to mobilize the diverticulum and close off the mediastinum so that the receding operation can be performed in the presence of so little wound with little risk of infection of the mediastinum.

The patients postoperative course was excellent. On the fifth day after partial resection of the sac was completed all the air of the esophagus which kept ballooning up the diverticulum. The patient was undisturbed and had passed peristalsis.

the loop held over the little finger is released. Traction upward and outward on the two free ends completes the inversion. The purse string is tied three times and cut close. While I believe that the purse string would be sufficient to hold the esophagus closed we will reinforce the inversion stitch by three interrupted mattress suture of No. 2 chromic catgut for greater security. There has been no soiling; the mediastinum has been closed by the exudative tissue from the first operation. The retractors are removed. The thyroid drops back in place; the infrahyoid group of muscles are sutured together and the skin wound closed with Michel clips. We will place a small piece of rubber tissue under the skin to take care of any possible tissue drainage.

The Levine tube is passed through the nose into the stomach. It passes readily enough and is apparently in the stomach as indicated by the black marker. The Levine tube is fastened to the cheek by a suture placed later (Fig. 181). You will recall that in the act of swallowing there is a closure of the esophagus at the cardiac end. The effect of this mechanism is to hold the material contained within the esophagus under pressure until the peristalsis from above forces the material into the stomach. The act of swallowing means the application of a centrifugal pressure to the walls of the esophagus and we do not wish to expose our esophageal wound to this force until after three days have elapsed. Accordingly, all feeding for the next three days will be through the Levine tube.

The postoperative conduct of this case will be essentially the same as after the first operation, namely, sitting position. Murphys protocol: of 500 cc of tap-water and 50 gm of glucose every four to eight hours; morphine $\frac{1}{2}$ grain for pain or restlessness; and during the first three days additional fluid—milk, tea, coffee and water—can be given through the Levine tube. In the first twelve hours we will aspirate the Levine tube every four hours if there is nausea after each time any fluid material may be given through the Levine tube.

Some days after finishing an operation for a massive goiter, a spontaneous esophageal perforation occurred. A duodenal tube was introduced into the stomach and the patient was nourished



Fg 180—La l f d rt l m f co d bl coll psed



Fg 181—D ert cul m sed L be h gh l f l m
h P t t k f h seco d g pe

DISARTICULATION AT SHOULDER FOR OSTEOGENIC SARCOMA LEFT HUMERUS

Osteogenic Sarcoma Ewing's Classification of Bone Tumors
Allocation of Telangiectatic Osteogenic Sarcoma Discussion of
the Danger of Performing Biopsy Diagnosis Clinical and by
x Ray Examination Operative Technic Prognosis

History—The patient I am presenting is a man twenty three years of age born in New York who entered the New York Hospital complaining of swelling of the left arm with constant pain of a full heavy character for the past three weeks. The family history of the patient is unimportant and his own personal history is not noteworthy. About a month ago the patient noticed that his left arm above the elbow seemed larger than the right and there was considerable soreness along the external surface of the left arm. The condition remained unchanged for about two weeks when the patient noticed that the arm began to increase rapidly in size. It became more tender with continuous pain throughout the entire left arm from the shoulder to the elbow. The physical examination of the patient except for the left arm is unimportant. The heart and lungs are negative. The abdominal examination including function is normal. The x ray examination of the thorax shows little evidence of pathologic change. There is slight right bronchial thickening but no evidence of parenchymatous infiltration. There is however slight intralobar pleural thickening of the left side. The x ray examination of the left arm and humerus shows a fusiform tumor of osseous origin occupying the middle of the left arm. There is periosteal elevation with irregular subperiosteal bony proliferation and slight cortical destruction suggestive of periosteal osteogenic sarcoma (Fig 183).

In brief we have a normal healthy young man of twenty three years of age having a fusiform neoplasm in the almost the entire left arm from the shoulder to the elbow. On palpation

through the tube for twelve days. During this time the esophageal fistula closed. At the present time we prefer the Levine tube for this purpose.

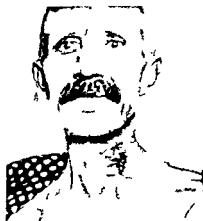


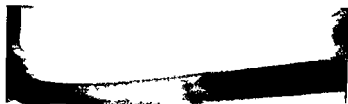
Fig. 18.—Photograph taken three days from first operation, showing the fistula closed.

Postoperative Note.—The patient made an uneventful recovery. The Levine tube was removed three days later and the patient was discharged from the hospital on December 1st, two weeks after the first operation, with no malnutrition (Fig. 182).

possible remove all of the growth at one time together with all the tissue surrounding the tumor intact and undisturbed. If we are in time or in other words are operating before visceral metastases have occurred the boy escapes with the loss of his entire left arm but saves his life. If however we are too late the ultimate outcome is the loss both of his arm and his life.

Operation—The amputation of an arm at the shoulder joint is a surgical procedure of magnitude and hemorrhage is one of the technical complications to be overcome. As a matter of fact the control of hemorrhage should not be particularly difficult. By following a logical plan it is not necessary to transfuse the shoulder with pins to control bleeding. The patient is anaesthetized with ethylene gas and the left arm is extended out (palm upward) over the operating table and held by the sterile nurse. The first incision is for the purpose of ligating the axillary artery in the third portion of its course. This incision is along the inner border of the coracobrachialis muscle just above the lower edge of the fold of the axilla. The deep fascia is divided. The coracobrachialis muscle and the musculocutaneous nerve are pulled outward. Lying on the artery at its outer side is the median nerve. This is also drawn upward and outward. On the inner side we see the axillary vein and the ulnar nerve beneath it. The artery is now divided between two ligatures of No. 2 chromic catgut and a second ligature of No. 2 chromic catgut is applied to the proximal end of the divided axillary artery. We have ligated the artery above the origin of the subcapular and above the anterior and the posterior circumflex arteries so that the collateral circulation is free is not disturbed. The only vascular anastomosis that now remains is between the acromioclavicular artery passing over the humeral joint in connection with the arm and anastomosing with the anterior circumflex artery. Our bleedings are controlled except for the blood supply that comes down on or below the distance of the deltoid muscle. It is our custom to inject the proximal nerve trunk with 1 cc of sterile absolute alcohol before ligation. The innervated nerves are pulled down injected with alcohol and then divided below the site of the injection.

tion the swelling seem to be due to a bony growth but the
 no evidence shell could be seen. The case is a peculiar reddish blue
 over the entire arm and the veins are dilated. The roentgen exam-
 ination shows no evidence of any pathological condition of the
 chest or lung but does confirm the clinical diagnosis of sarcoma
 of the left humerus. Previous to his admission to the hospital
 the patient had gone to the dispensary and it had been suggested
 that he have a biopsy performed. In other words, the incision
 was to be made down to the bone and a small section of the
 tumor removed for histologic examination. I was unalterably
 opposed to this course of action. The diagnosis of bone neoplasm
 by frozen section is a matter of some difficulty with a fair margin



L.

Fig 183 — Ray photograph of the humerus of a patient with
 sarcoma of the bone. The tumor is located at the distal end of the bone.

of error. The conditions that surround a biopsy for a papilloma
 of the tongue or neoplasm of the lip or a small isolated tumor
 of the breast are different from those that pertain to a biopsy of
 sarcoma of the

The question of amputation of the boy's arm is not
 undecidable. The question is, we have time to
 save his life. There can be no question as to when an amputa-
 tion should be performed. There is every reason to believe that it is
 certainly possible. It is beyond our knowledge to kill and
 ability to tell just how far the tumor has crept up
 the shaft of the humerus. To operate through a small area
 spelled disaster. While the surgery contemplated must be

but free invasion is also seen. There is a great deal of bony tissue throughout the muscle. The microscopic examination shows a neoplasm which consists of large polyhedral cells. The nuclei are mostly elongated vesicular. Mitotic figures are exceedingly numerous. There are numerous giant cells of the endothelial type. There are very rich blood vessels everywhere. There are also large cavernous spaces lined by one layer of cyl

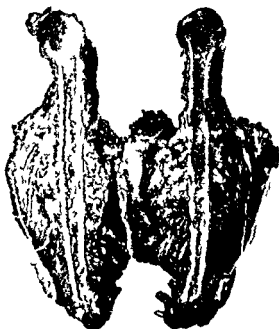


Fig. 11. Myeloid sarcoma of humerus. Section showing growth invading the medullary canal.

interstitially filled with red blood cells. The growth invades the tunnels of striated muscle extensively. Diagnosis: Telangiectatic periosteal sarcoma of humerus. Note: This is one of the most rapid growing neoplasms.

The patient made an unsuccessful recovery. There was a light degree of hemorrhagic discharge from the lower angle of

The median ulnar cutaneous and lesser cutaneous nerve are now divided. A circular incision entirely around the arm is now made at right angles to the original incision. This incision is carried down to the bone and in this particular case at about 5 cm above the insertion of the deltoid. The soft tissue are separated from the bone and the capsule of the joint exposed. The capsule is now incised and by bending the arm downward disarticulation is accomplished. Humeral is accomplished by ligation with No. 3 plain catgut. The anterior and posterior muscle groups are brought to ether by a continuous running suture of No. 2 chromic catgut. This is readily accomplished and gives a firm fleshy muscle block over the glenoid cavity. The fibres of the anterior and posterior muscle groups are also approximated with interrupted suture of No. 2 chromic catgut. A small piece of rubber tissue drainage is placed in the lower part of the wound and the kinetic closed with Michel clip.

The patient will be placed in a sitting position given to gain of motion in very short hour for pain or rest. Water by mouth will be allowed freely and in addition 500 cc of tap water with 50 gm of glucose will be administered by rectal drip every eight hours. In immediate postoperative days a shock hemorrhage and of much likelihood exists. Protection against hemorrhage is secured by the primary ligation of the axillary artery and block is not very imminent.

The pathologic examination of the left arm by Dr. Alter follows. Specimen consists of left arm, humerus articulated at the shoulder (Fig. 184). It is very well developed. The hand and lower forearm have nothing unusual. The kin shows nothing unusual. At the middle of the humerus there is a spindle shaped lesion. On section at level of blood vessels from irregular cavity. The lesion is a growth 13 mm in length which seems to arise from the proximal end of the humerus. It occupies about the middle third of the humerus. The growth extends within 6 cm of the neck of the humerus. The tumor is very soft friable and breaks down under the finger. Through out the muscle tissue there is a small area of inflammation.

may or may not intervene for a long period of time after a primary amputation. In fully 50 per cent of the case with this type of sarcoma metastases are detected by x ray examination at the time the patient presents himself for operation. The duration of the patient's growth was relatively short which would seem to indicate a rapidly destructive lesion. The hopeful sign however is the short time between the development of the tumor and his amputation. If metastases are present the outlook is hopeless and death may be expected in from a year to fourteen months. Verding in a study of the microscopically proved cases of sarcoma of the long bones at the Mayo Clinic reports 37 cases out of 35 patients who died had amputations for their growth. The average duration of the disease at the time of their examination was 13 months and the patients lived on an average of fourteen and a half months after operation.

The prognosis for this patient is obviously most grave.

the wound and patient was discharged from the hospital with the wound healed *per prius* on the eleventh day postoperative.

Discussion—The allocation of tumors of the bone and bone marrow in a classification is difficult. For the purpose of a uniform nomenclature we have accepted Ivin's classification.

	C	B	T
Osteom	$\left\{ \begin{array}{l} \text{Spongy} \\ \text{Ivory} \end{array} \right\}$		
Chondroma	$\left\{ \begin{array}{l} \text{Pachyderm} \\ \text{Chondromyx} \\ \text{Myxoma} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Capillary} \\ \text{Pigment} \\ \text{Central} \end{array} \right\}$	
Angioma	Connective		
Ectodermal	$\left\{ \begin{array}{l} \text{Angiodermoid} \\ \text{Dermoid} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Solitary} \\ \text{Multiple} \end{array} \right\}$	
Bone metastasis	Primary	$\left\{ \begin{array}{l} 1 \text{ Bone cyst} \\ 2 \text{ Giant cell tumor} \\ 3 \text{ Zosteroma} \\ 4 \text{ Myxoma (benign)} \end{array} \right\}$	
Osteogenic sarcoma	$\left\{ \begin{array}{l} \text{Pachyderm} \\ \text{Solitary} \\ \text{Transitory} \\ \text{Telangiectatic} \\ \text{Sclerotic} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Pigment} \\ \text{Solitary} \\ \text{Transitory} \\ \text{Telangiectatic} \\ \text{Sclerotic} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Pigment} \\ \text{Solitary} \\ \text{Transitory} \\ \text{Telangiectatic} \\ \text{Sclerotic} \end{array} \right\}$
Myeloma	$\left\{ \begin{array}{l} \text{Plasma cell} \\ \text{Lymphocytic} \\ \text{Myelocytic} \\ \text{Erythroblastic} \end{array} \right\}$		

The diagnosis of the bone tumor of this patient as made by Dr. Alter that of a telangiectatic primary sarcoma. This is the third case under osteogenic sarcoma and I take the opportunity of quoting from Dr. Ewing's paper. The gross anatomical picture has been difficult with difficulty that one can determine any point of origin. It is a very mild structure type of tumor and does not direct itself into all directions of the bone and spreading into the surrounding soft tissues. The particular type of tumor is particularly limited to young subjects.

Metastases of the lung are the most common complication of this condition and they may occur any time after the beginning of the growth. The symptoms of pulmonary metastases

CLINIC OF DR. WALTON MARTIN

ST. JAMES HOSPITAL

PSEUDOHERMAPHRODITISMUS MASCULINUS

I PRESENT this patient not only on account of the congenital anomaly which is uncommon but also to discuss the surgical procedure which may be carried out to ameliorate the condition.

The patient aged fourteen years and dumb from birth was christened Grace and has been brought up as a girl. When six years old the child was sent to an institution for the education of deaf-mute and has been there until twelve years before admission to the hospital. During the eight years the child slept in the girls dormitory and was educated as a girl. The child is below the average intelligence of children of her age.

A nurse in taking the rectal temperature a few weeks ago noticed for the first time the size and prominence of the so-called clitoris and reported the matter to the attending physician. He examined the patient carefully and asked me to see the child in consultation.

The pubic hair was well developed and of the female type. The breasts were not developed. The body was rather lean and muscular. The so-called clitoris had the appearance of a penis with well developed glans. There was no urethral opening. A light ball of epithelial groove extended along the under side of the glans. The skin of the body of the organ was like that of the under lip and on the sides by loose folds. That is to say that the body of the penis-like structure could not be lifted free from the bed of which it occupied except to a limited extent. There was a distinct vagina with a rudimentary hymen admitting easily to a finger. The urethra opened into the vagina. There were two distinct labia majora. On examination at that

CLINIC OF DR. WATSON MARTIN

ST. LUKE HOSPITAL

PSEUDOHERMAPHRODITISMUS MASCULINUS

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The patient aged fourteen deaf and dumb from birth was christened Grace and has been brought up as a girl. When 12 years old the child was sent to an institution for the education of deaf-mutes and has been there until to-day before admission to the hospital. During the eight years the child kept in the girl's dormitory and was educated as a girl. The child is below the average intelligence of children of her age.

A nurse in taking the rectal temperature a few weeks ago noticed for the first time the size and prominence of the so-called clitoris and reported the matter to the attending physician. He examined the patient carefully and asked me to see the child in consultation.

The pubic hair was very scanty and of the female type. The breasts were not developed. The labia rather large and muscular. The so-called clitoris had the appearance of a penis with well developed glans. There was no urethral opening. A light hair epithelial groove extended along the under surface. The skin of the body of the organ was like that of the vulva and lay on the scrotal folds. That is to say the body of the penis-like structure could not be lifted free from the bed which it occupied except to a limited extent. There was a distinct vagina with a rudimentary hymen admitting only the index finger. The urethra opened into the vagina. There were two distinct labia majora. On examination at that

6 cm long. I cannot feel a uterus or anything corresponding to a prostate. There is a distinct thickening on the left side. I insert a small speculum through which I introduce a Cameron light. The walls of the vagina look normal; there is no distinct cervix; the upper portion of the vagina is closed by a transverse fold.

This patient cannot be classed simply as a male with an undescended testicle and hypospadias. The female urethra or the first part of the male urethra is developed in connection with the bladder from the allantois. In perineal hypospadias and in the female the anterior urethra does not develop and such a condition is here present but in this instance the lower portion of the fused ducts of Müller has persisted forming a true vagina.

The persistence of the Müllerian duct or portions of them forming uterine tube, uterus, vagina with normal testicle and vasa deferentia has been noted as we have said a number of times. Dr Woolsey showed a patient supposed to be a woman before the New York Surgical Society in 1913 from whose vaginal region a testicle was removed. The patient was very similar to the one we are showing. Dr T. C. Webster in 1907 showed a specimen of uterus and tubes taken from a man who had begotten children. It is unnecessary to recall other cases reported. Each year one or two appear.

It may be well to review very briefly the development in the embryo of the sexual organ. I am sure most of you remember Allen Thomson's three diagrams in Quain's Anatomy or similar diagrams given in other text books. The first shows the development of the urogenital organs in the indifferent bisexual hermaphroditic stage. The genital ridge from which either the testis or ovary is formed, the Wolffian body, the Wolffian duct, the right and left Müllerian duct are represented.

The second shows the same structures in the female type. The ovary has developed from the genital ridge, the Wolffian body and Wolffian duct have disappeared. The duct of Müller has become the uterine tubes and united have made the uterus and vagina.

time we were unable to detect anything abnormal in the inguinal canals. The child had not menstruated.

I recalled several papers written during the last twenty years showing that the largest class of congenital abnormality of the excretory apparatus both in man and in the domestic animal was one in which to the casual observer the external appearance of the genitalia at birth and during youth is that of the female. At puberty however male secondary characteristics and male instincts appear. Dissection in animals and operation in man have frequently shown two sets of ducts the uterus and vagina and the epididymis and deferens but only one type of reproductive glands—testes not ovaries.

I therefore advised the attending physician and the superintendent in charge of the institution that the so-called girl might develop as a boy—that it would be well to send the child to the hospital to make an examination under ether and to operate if necessary to determine the sex. They both expressed strong disapproval of my attempt to change the established sex life of this feeble-minded defective even if only one set of reproductive organs were found and the child. They both thought however that the whole question should be placed before the child's parents and their wishes noted.

This was done. The mother said that she had noticed the large so-called testis and had taken the child to her family doctor when only a few years old. He had told her that the girl had a hypertrophied testis which might someday need amputation. Both patient expressed the unwillingness to consider the child a boy and requested that if a possible means were carried out which would make it possible for her to grow up as a girl with girls. The child has been fixed to my understanding under the condition. She is now under treatment and you can see the condition. I have already described it except that with the absence of the pubic hair the primary structure is more prominent and that in the upper position of the inguinal canal on each side a small round lump can be palpated firmly undescended testicles. I shall now make a physical examination. The age is as fully admitted and verified and about

tion and the even wider range of differences in the secondary sexual characteristics and ex behavior such as distribution of hair width of pelvis changes in voice roundness of body contour with which we are all familiar.

The subject is further complicated by the relation of all the glands of internal secretion to one another. There is evidence that they act on one another so that observers like Blair Bell speak of a man being a man or a woman a woman not only because of their ex glands but because of all their internal secretions and their endocrine balance.

It is incorrect however to assume that a child has always but one type of ex gland—that he is male or female showing variations only in secondary ex characters including the arrangement of ducts and aperture. Two cases showing the contrary were reported in 1924—one in the *John Hopkins Bulletin* by H. H. Young the second by Burden in the *Journal of Urology*. In Dr. Young's case an athletic boy eighteen years old came to him for operation for hypopadism and undescended testicle. On the left side a testicle could be felt in the scrotum on the right there was a mass in the inguinal region. This proved to be an ovary with a ruptured Graafian follicle. A specimen taken from the gonad in the left scrotum showed the structure of a testicle. The case of Dr. Burden is even more interesting. A man of fifty with scant beard and sunken limbs had periodic hematuria. On cystoscopic examination only one urethral orifice was found. There were normal male external genitalia excepting that the normal looking scrotum contained no testicles. A median laparotomy showed one kidney a bicornuate uterus two ovaries and two testicles. A male urethra of the gonad bicornuate uterus and duct was removed. A sketch of these structures is given in the paper. The periodic hematuria ceased. The individual had been menstruating the menstrual blood passed out periodically through a normal looking penis. Forty years ago while a student of Harvard at Yale I dissected a kitten with one kidney and two testicles and ovaries similar to the case reported by Burden.

In the third the male type is shown. The testicle has developed from the genital ridge, the Wolffian ducts have formed the vas deferens, the Wolffian body has made the vasa efferentia. The Mullerian ducts have atrophied.

The changes in the genital ridge occur very early in embryonal life. Wallever has noted change in the incubation of the male chick as early as the fifth day, but the sexual state persists up to the tenth or eleventh week. Probably under the dominance of the endocrine change occurs in the ducts, apertures, and structure, and the changes in anatomy may be considered as secondary sexual characteristics.

The sex of the individual depends upon whether the testicle or an ovary develops. It depends on the structure of the gonad. According to the theory of Morgan it is an inherited characteristic dependent on the number of chromosomes in the nucleus of the developing ovum. If the ovum fertilized with a sperm cell without a sex-linked chromosome, a male results. If however the ovum is fertilized with a male cell containing one sex-linked chromosome, then there are a pair of such in the developing ovum, one being furnished by the ovum and a female results. The sex of the type of male sperm cell, one with and one without sex chromosome.

During the last fifteen years a number of experiments on vertebrate animals have shown that the obvious, constant sex characteristics such as the development of mammary glands, change in the voice, behavior, etc., are dependent on the internal secretion of the reproductive glands. These secondary sexual characteristics only indirectly enter into the framework of the hereditary sex-linked character, but are dependent on the hormones of the reproductive glands.

There are apparently several at least the potency of hormones, which finally express themselves in differences in the secondary characteristics. Some of them appear very early in the first stages of embryonal development. Others appear in the late embryonic period and still others at puberty and after puberty. This theory seems to offer an explanation of the wide range of variations reported in the congenital malformations.

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The changes in the genital ridge occur very early in embryonal life. Waldeyer has noted changes in the incubation of the male chick as early as the fifth day, but the bisexual stage persists up to the seventh or eighth week. Probably under the dominance of the sex gland secondary changes occur in the ducts, apertures and structures and these changes are as they may be considered a secondary sexual characteristics.

The sex of the individual depends upon whether a testicle or an ovary develops. It depends on the structure of the gonad. According to the theory of Morgan it is an inherited characteristic dependent on the number of chromosomes in the nucleus of the developing oötheca. If the ovum is fertilized with a germ cell without a sex-linked chromosome a male results. If however the ovum is fertilized with a male cell containing a sex-linked chromosome then there is a pair of such in the developing oötheca, which is furnished by the ovum and female results. There are two types of male germ cells, one with and one without sex chromosome.

During the last fifteen years a number of experiments on euteleostean animals have shown that the following secondary characteristics such as the development of mammary glands, change in the visual sex behavior, etc. are dependent on the internal secretion of the reproductive glands. The secondary sexual characteristics only indirectly enter into the formation of the hereditary sex-linked characters but depend on the hormones of the reproductive glands.

There apparently exists a transition between the primary of hermaphroditism and the secondary of hermaphroditism in the social sex characteristics. Some of them appear very early in the first stages of embryonal development. Others appear in the developing child and still others at puberty and after puberty. The theory seems to offer a plausible explanation of the wide range of variation proposed in the genital morphology.

a small roundish mass that looks like the usual undescended testicle. I isolate the vas, tie off and sever the vesicle of the cord, divide the vas and remove the testicle. I do the same on the opposite side and suture the small wounds. There can be no question of the nature of the gonad—they are undoubtedly testicles. I now make a transverse cut below the symphysis and from its center carry two curved, circumscribing incisions about the base of the penis. I then expose the dorsal vesicles, ligate them and reflect back to the crus on each side. The structures are cut across. There is no corpus spongiosum. A plexus of veins spreads out on each side of the organ, making much oozing. After attempting accurate hemostasis I close the wound, the upper part horizontally, the lower part vertically. The vulva now look normal (Figs. 185-189).

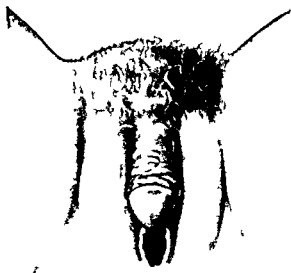


FIG. 185—Pseudohermaphroditism in male. Vulva after operation. (See text for details.)

We must decide whether we shall leave the patient alone to develop as an imperfect male. Shall we attempt to reconstruct the urethra, obliterate the vagina, attempt to make a scrotum and liberate the penis or shall we amputate the penis and remove the testicle, leaving the child as a supposed girl?

If we leave the child in the present condition normal copulation is impossible. As sex feeling develops it cannot be gratified. In a dormitory with other girls an attempt at intercourse with friction and the discharge of semen through the vagina might be attempted. In a dormitory of boys the deformity of the organs, the quivering in passing water, the presence of a vagina might lead to humiliation and indignities.

An attempt to liberate the penis would be easy but a plastic operation to reconstruct the urethra would be very difficult, painful and would necessitate repeated operations. If it should be successful we would at the best but enable a backward deaf-mute to procreate or satisfy the element.

I have decided therefore to remove what I suppose to be the testicle from the inguinal region and to amputate the penis. The child is fourteen. Will the castration at this period modify so that the secondary male characteristics may not develop? Will her face remain smooth? As she cannot speak change in voice cannot occur. Will her form become more rounded? Castration before puberty should produce all these results. Castration in adult life changes the secondary characteristics but little. Thirteen years ago I removed in a married man forty-one years old both testicles for tuberculosis. He reports that he had normal relations with his wife for several years after the castration. There has been no change in the secondary sexual characteristics.

Puberty is best delayed in this child. I believe that we will hold back the secondary characteristics. The testicular hormone will not be liberated into the circulation of the mature child.

Through an incision through the inguinal region the internal abdominal ring is exposed, the aponeurosis of the external oblique is divided and the inguinal canal is picked up and freed.

pened in many place. Among others an infant with doubtful sex and another sixteen year old a very hermaphrodite were found. They were ordered to be immediately thrown into the sea as had been lately done with a production of the same monstrous kind.

To return to the present I am inclined to think that the knowledge should be wider that children born with a well



Fig. 1. — Unsexed infant of 16 guinea

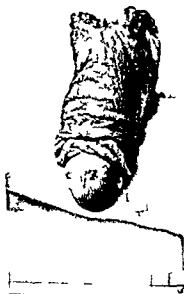


Fig. 18. — Ampullated

developed penis if no testicle can be discovered and proposing a rudimentary vagina should be brought up a boy not girl with the hope that the physician Sir Thomas Brown expressed it that the succeeding years will produce the manifest evidence of their malities. In grown children and adults I shall be inclined to respect the patient's wishes and should

It is interesting to speculate on the best procedure in the case of anomalies which involve not only an unsightly malformation but are concerned in sex behavior in the sex psychology of the individual as well as in legal questions involving inheritance, potency and legitimacy of offspring.

It is not a new question. Biblical individuals or those appearing bisexual have existed since earliest times.



Fig. 186—The same as Fig. 185, but with the head and thorax removed, showing the genitalia and the structure of the abdomen.

Learned rabbins have debated the exact interpretation of the twenty-eighth verse of the fifth chapter of Genesis as to the hermaphroditic nature of Adam the first man. I have recently read a Letter to the Roman hierarchy in the century before Christ, a method of disposal which bypassed all difficulties. After sacrifice to the temple priests, it announced a hanging by the

CLINIC OF DR. HOWARD HILINTHAI

MT. SINAI HOSPITAL

BRONCHIAL FISTULA FOLLOWING PULMONARY ABSCESS EXTIRPATION

ONLY two days ago this finely developed boy of thirteen George I. was referred to me by Dr. Edward S. Newell of Pelham Manor. In early childhood this boy had been delicate. At the age of about eight his tonsils had been removed in ether anaesthesia and after an interval of about six weeks during which few or no symptoms were present a cough with gradually increasing expectoration developed. There was fever which ran as high as 103 F. but there were remissions and the patient was up and about the greater part of the time. Repeated examination for tubercle bacilli negative.

In December, 1923 he had been operated upon for what had been regarded as empyema of the left chest, a single rib having been resected in the axillary region with the evacuation of much foul pus. Later on it was necessary to make a second incision low down in the back between the ribs. For three years this boy wore a tube in the upper wound and after that he appeared to be entirely well except for a bronchocutaneous fistula. The boy's attitude was fine. There was clucking of the finger but otherwise he seemed like his mother to be entirely well except for the fistula which I have mentioned.

Suddenly about two months ago there came a severe hemoptysis with expulsion of blood through the fistula as well as by mouth. Since that time light cough has always been present with repeated minor hemoptyses.

At examination by Dr. Jachess revealed a peculiar deformation of the fourth rib showing a hole which apparently had been

CLINICAL HISTORY. I. T. Jones, M.D. Hospital, September 29, 1924

take into consideration all the *secondary characteristics* as well as the actual nature of the gonad. In most instances I should hesitate on transmutation of sex or supposed sex or sex habit. I should keep in mind that to the commonplace man or woman the question of sex is decided not by the microscopic examination of the reproductive gland but by the whole group of secondary sexual characteristics including the external appearance of the genitalia.

tion has been as to the exact technic and I have decided that we might surround the fistulous opening by our incision and dissect it down to where it comes through the rib. After that we shall proceed according to what we find.

You see that I am making the incision spindle shaped with the widest part on either side of the fistula. It is easy to dissect the fistula itself—a firm fibrous structure completely lined with skin down to the opening in the rib. It appears to me that it will be best to reflect the rib by cutting it through about 1½ inches on each side of the fistula and I shall do this by the subperiosteal method.

Now I divide the rib posteriorly about 1 inch away from the opening and now anteriorly also about 1 inch away. You will see that the muco has been freed from the opening in the rib and I am lifting the rib out so that the fistula itself with its surrounding skin lip through the hole in the bone (Fig. 189).

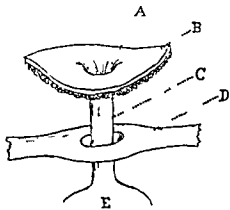


Fig. 189. Case of George L. B. bronchial fistula. A Opening of the fistula. B Area of dissection. C Incision. D Rib reflected. E Skin lip. (See text.)

We now have a wide opening into the chest and I can hold the muco in my hand by its skin pedicle and dissect it down to the cavity from which it came. This has a central hailem

left when the retracted rib reformed around a drainage tube. Otherwise nothing remarkable could be seen although Dr. Jaques noted that the upper lung markings were exaggerated and suggested the possibility of fibrosis in this area. No fluid could be seen. There were no other abnormal thoracic appearances.

I would call attention to the fact that when I saw the boy there was no discharge whatever from the large bronchial fistula. He could breathe through the opening with his mouth and nostrils closed. On coughing there was no discharge, not even mucus. It looked like an absolutely perfect example of a bronchial stomia in the chest wall and had it not been for the number of sad experiences which I had encountered in years gone by I might have counseled further delay in making an attempt to close the fistula. In the other cases seen after years of apparent good health hemorrhage or infection appeared and in three instances which I observed death followed from hemorrhage followed.

Therefore in this nice looking healthy boy I regarded the appearance of hemoptysis as alarming not to be overlooked but to be acted upon as soon as possible. When the cases once began to bleed I lost confidence. I also warned the boy's mother that although manifestly the absence of any discharge indicated a good fighting opportunity of success with a single operation the real produces might be necessary in order to obtain a permanent closure. My advice was instantly taken and the result that only ten days after his first visit to me you see this boy here is fitly prepared for operation and under the law with no trouble and no ether.

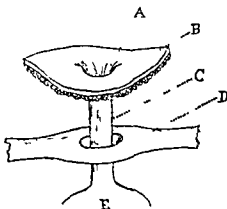
Dr. Brauer, the anesthetist and Dr. Ira Cohen will act as first assistants. The danger of hemorrhage—unexpected and sometime very terrifying—so great that any operation upon the lung that I do is not at all expected any such accident I am prepared for transfusion. Dr. Roth has grouped the patient's blood.

I have deliberately effected this very operation making further delay undesirable. I felt that the operation was so large that it would be wise to explore the depth of this cavity when it would have been taken off. The only que-

tion has been as to the exact technic and I have decided that we might surround the fistulous opening by our incision and dissect it down to where it comes through the rib. After that we shall proceed according to what we find.

You see that I am making the incision spindle shaped with the widest part on either side of the fistula. It is easy to dissect the fistula itself—a firm fibrous structure completely lined with skin down to the opening in the rib. It appears to me that it will be best to resect the rib by cutting it through about $1\frac{1}{2}$ inches to each side of the fistula and I shall do this by the subperiosteal method.

Now I divide the rib posteriorly about $1\frac{1}{2}$ inches away from the opening and now anteriorly also about $1\frac{1}{2}$ inches away. You will see that the mucoha has been freed from the opening in the rib and I am lifting the rib out so that the fistula itself with its surrounding skin lies through the hole in the bone (Fig. 189).



I have cut the rib about one inch from the opening. A Open the rib. B Are the ribs directed out. C The ribs are directed out. D The ribs are directed out. E The ribs are directed out.

We now have a wide opening into the chest and I can hold the mucoha in my hand and dissect it down to the cavity from which it comes. This boy has evidently had em-

pyema as his history stated and you note that there is no actual pleural cavity. Firm, but tough, serosa unite the visceral and costal pleurae so we need not be particularly afraid of infecting the general chest cavity. I shall now insert one blade of the dissecting scissors into the sinus and divide its wall so that the entrance is laid open and can be followed by repeated dips of the scissors into the cavity within. This cavity I find is the size of a large English walnut and it appears to be divided into three main portions by membranous trabeculae.

I am now endeavoring to cut these trabeculae with scissors so as to convert the cavity into a single space but you see I am working very slowly so that in case I happen to divide a bleeding vessel I may be able to check the hemorrhage before proceeding further. Here and there I think it wise to put in suture ligatures even before making the division.

Now the entire fistulous tract with even a part of the wall of the cavity itself cut away with scissors. The opening into the cavity is so ample that we can see clearly several bronchial tom-toms large enough to admit a good sized probe and contact with the bronchial wall produces coughing. I will ask for the electric cauterizer and I am burning as much as seems safe of the mucous lining of the cavity so as to destroy it. Instead of packing this opening with gauze I believe that adhesion of the walls on healing will be better brought about if we push the lung forward away from the wall of the cavity and pack here so as to push the side of the cavity to either thus obliterating this four-year-old process.

I lay this piece of crumpled rubber dam down upon the gauze so as to make elastic pressure and then upon this I place another small pad of dry gauze just the size of the wound and hold it in place by a piece of elastic adhesive plaster. In a few days I shall remove this dressing, take out the gauze and pack and continue thus daily until complete obliteration of the cavity shall have occurred.

I have been most fortunate in carrying out this operation. There has been very little bleeding, almost no coughing and our exposure has been all that could have been desired. The elastic

adhesive plaster is a most important adjunct in a case of this kind for it leaves the opposite chest free for respiration and at the same time makes direct and firm pressure where it is most needed.



Fig. 180.—Case of George L. J. Right lung fistula. Patient in the position of the left lung. The left lung is in place.



Fig. 191.—Case of George L. Same as Fig. 180 but later in view.

Postoperative Notes—The packings were not removed until the end of the eighth day. There was no anaerobic or other important infection. The wound gradually filled up and the bronchial fistula slowly but steadily closed. On the thirteenth day the patient went home and a few days later the wound was entirely healed and has remained so.

On October 23, 1928, about three weeks after operation, I packed the wound with gauze soaked in lipiodol and Figures 190 and 191 show the general location and size of the cavity. I am glad to say that at the present time, January 18, 1929, the boy has remained perfectly well and even the clubbing of his fingers seems to be greatly diminished.

PRIMARY CARCINOMA OF THE LUNG—LOBECTOMY

OUR patient is S. K., a man of forty two who was referred to me by Dr. Meyer Rabinovitz of Brooklyn about a week ago. The patient had been complaining of vague pains in his chest over a period of about five months but for a number of weeks there had been excruciating arthritic pains in the joints of his long bones with swelling. The patient had had a luetic infection and the Wassermann test of his blood had been markedly positive. This was a number of years ago however and under appropriate treatment great improvement had taken place.

Dr. Rabinovitz was first consulted last August and after a thorough examination at first no diagnosis was possible. Auscultation revealed some diffuse sonorous râles but no consolidation. There had been no shortness of breath but the occasional slight streaking of blood in the sputum with the presence of clubbed fingers led to an x-ray examination which at once revealed a hardly definable rounded mass in the right lower lobe (Fig. 192). No tubercle bacilli were present and since the Wassermann test was now negative Dr. Rabinovitz made a diagnosis of primary carcinoma.

Cancer of the lung seems to be actually increasing in frequency and this must be taken into consideration in arriving at a diagnosis in doubtful tumors of the lung whether they are squamous or not. The pathologist in this country and in Europe judging by the number of neoplasms encountered on the post mortem table seem to have concluded of the actual increase in this disease. The explanation is unknown and it would be futile to suggest that it is cigarette smoke or automobile gas or the ailments of the modern era. Still when you see an opacity in the lung of an individual of cancer age demonstrated in the x-ray film cancer should be considered a possibility much often than it would have been ten years ago. This ought to

mean that operations for the removal of doubtful pulmonary tumors should be much more frequent than they have been in the past. Unfortunately physicians are very slow in referring lung cases to the surgeon.

By the time I saw this patient his cough had completely disappeared and there were no physical signs leading one to suspect any thoracic condition. X-ray examination at Mt. Sinai Hospital revealed a spherical mass about 2 inches in diameter in the paravertebral portion of the right lower chest on

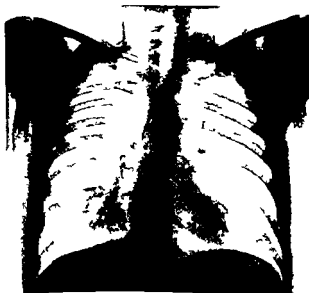


Fig. 19.—Chest of Sam K. p. m. y. m. f. l. g. ght l. l. be

a level with the ninth dorsal rib (Fig. 19). It appeared to be continuous with the hilum shadow and was thought to be a neoplasm. In the right wall of the trachea extending into the right bronchus there was an increased density which it was suggested might be due to an extension of the growth. The remainder of the right lung appeared normal and the left lung showed nothing except slightly attenuated hilum shadows.

The other thoracic structures including the ribs revealed no disease.

Four days ago Dr. Mervin Myerson performed a bronchoscopy and found a coating which looked like tissue apparently adherent to the wall of the right lower lobe bronchus extending to within $1\frac{1}{2}$ inches of the bronchial opening of the upper lobe. He removed a specimen and at the pathologic laboratory it was found that this was some form of exudate upon the bronchial wall and not organization of any kind.

It was not until after the bronchoscopy that I first saw the man. He complained of nothing except pain in his joints especially the knees and ankles so agonizing that he cried out at the slightest touch and even cringed when the finger was pointed at the affected parts. There were no signs whatever to suggest intrapulmonary suppuration nor were any tumor or mass of any kind found on general examination of his body.

With suppuration ruled out and in the absence of pus, it did not appear that the chest condition had anything to do with the joint symptoms although it is well known that even light suppurative disease in the lung may act as a focus producing painful arthritis. This patient had no fever and the diagnosis had to be made on the x-ray appearances. I believed that it would be worth while to operate and that it might be possible to get at the suspicious region in the bronchus. The physical examination was good. For the past two days large doses of aspirin and soda have relieved the pains in the joint.

So we have him under the influence of nitrous oxide and ether which is being administered by Dr. William Brainerd. Dr. Ira Cohen will act as my assistant.

Our program will be first to make a long intercostal incision with separation of the ribs so that we may accurately observe the condition within the pleural sac and then decide what will be done. This in all is a useful case; my standard method of procedure rather than to make rib resection with the extremely limited field which this affords. I have found on numerous occasions that a long intercostal incision with exposure by the rib retractor afford an opportunity of examining

all parts of the pleural cavity and the exterior of the lung unless adhesions are present.

Therefore we turn the patient upon his side and lie him upon his face breaking the table so as to produce strong scoliosis with the side to be attacked uppermost. We make our incision in the seventh interpace beginning about 1 inch from the spine and extending the wound forward almost to the limit of the pleural cavity. Just as the chest is opened Dr. Brannan who has adjusted his intranasal tube so that he may make use of intrapharyngeal differential pressure begins to pump the anesthetic vapor into the pharynx. As you see this prevents the lung from dropping away from the chest wall. Dr. Brannan is careful not to use sufficient pneumatic force to push the lung out of the chest but merely enough—say from 10 to 15 mm. of mercury—to make up for the abolition of the normal negative pressure within the chest. Then when the pleura is opened the lung does not fall away. The rib spreader is now put in and the handle is held by one of the house staff so as to steady the instrument. The pleura being normal and the rib therefore not held together by indurated tissue it is possible to spread the blades so that we have what looks like an enormous and fully 6 inches in diameter.

The first thing that we note is the cord like adhesion to the diaphragm. Although the appearance is not here for safety sake we will let the adhesion stay and I will bet we will get it. A few other filmy adhesions are easily broken down and I do not bleed. I can now feel the indurated solid mass in the posterior end of the lower lobe and take it out. I separate it from the union of the hilum. Placing my hand behind the mass I raise it up so that you may see that we are dealing with a solid body. Although the exposure is good and although I can feel the tumor as I use myself by the hand to push the remainder of the lung is apparently normal. I will cut the eighth rib posteriorly in order to get still more room for the exploration which I think I shall be able to accomplish.

As you see this rib section is easily and bloodlessly made by using the instrument from the epaxial wall and the rib with

the blade of the instrument upon the edge of the bone instead of in the usual way with one blade beneath the rib and one out side. Thus the intercostal structure are slowly crushed and the arteries do not bleed.

To gain room and therefore time I think we shall divide the fifth and sixth ribs also. I do not separate the periosteum but simply cut through all tissue upon the border. The apparently tumultuous action of the diaphragm which is always in readiness in operation of this kind can be checked if we are able to locate the phrenic nerve as it crosses the pericardium and pinch it with forceps. Dr Branower reduces the intra-thoracic air pressure and we draw the lung away from the pericardium nicely exposing the nerve. I pinch this nerve with forceps and you see that immediately the violent action of the diaphragm is replaced by a feeble flapping in paradoxical rhythm. I am sure that this will greatly facilitate the further steps of the operation. I have made use of this procedure in a number of cases and each time it is dramatic to see how the diaphragm ceases its tugging and pulling and becomes quiet.

The pulmonary ligament is exposed by drawing the lower lobe backward and is cut with scissors without hemorrhage. I now crush the pedicle of the lower lobe of the lung a little at a time and ligate with strong silk sutures first crushing then putting on an elastic ligature the titch and drawing it on. A very successful procedure necessary to crush the pedicle of even a healthy lung. You will note that a very few elastic or rubber titches are necessary to take in the pedicle of the lower lobe and I think it is safe to say that the middle lobe structure itself had better be taken. A suture is tightened and you will note that the usual ordinary large hemostatic needle in the field of a blunt suction will control the junction of the pedicle is cut through with scissors all out in hand away from the ligatures so as to leave just a stump of pulmonary tissue.

We then cut through the last attachment of the lobe and the specimen may be taken away. The exposed stump is crushed quickly with careful action and a large elastic band of the elastic ligatures are tied to the first one knot which will

be held to the chest wall by means of a large safety pin outside the skin. This prevents mediastinal flapping.

Notice how nicely the respiration is maintained by the intrapharyngeal insufflation and how easy it is to expand the remainder of the lung by this method. For drainage I will make a little incision in the tenth interspace posterior axillary line and a fair sized tube (a little larger than an ordinary lead pencil) is drawn through from within the chest with a forceps passed through the little incision. The knot of the ligature with the safety pin is passed out of the upper posterior angle of the wound and the chest now closed with pericostal sutures of double chromicized catgut. Then with muscle and fascia sutures in two layers partially interrupted and partly continuous I shall close the wound but not the edges of the skin. Instead I will lay the thin slip of iodiformed gauze between the lips of the cutaneous wound and will cover the whole incision with a small wet occlusive dressing under a rubber dam to cover the small white gauze external dressing.

I do not believe in great bulky dressings. When the patient is in his bed he will lie upon a soft pad which will take up the discharges and which the nurse will at all times be able to change whether or not blood is going on. With the usual head dressing post-hemorrhage may occur before it is noted from without. You will observe that I have made my drainage tube rather long extending 6 or 8 inches away from the chest wall. This will be clamped with forceps for the present in order to prevent the incision from closing. As soon as the patient is in bed an external piece will be added to this tube. Instead of the water seal drain I am now using a glass made of an ordinary thin tin can—not too long—and when I have tied the tin can to the tube the distal end of the can is lit with scissors. With every expiration air and fluid will pass out of the tube. With inspiration the walls of the tin can will come together and prevent pneumothorax. This is an adaptation of the principle described by Thiers many years ago.

Our patient is in good condition but the operation as you see has consumed more than a half hour. Dr. Nathaniel R. S.enthal

is here in order to perform transfusion. He will do this by the direct method from a donor who has been waiting in the next room for this purpose.

Please mark that this patient has no bandage or adhesive plaster encircling his chest. No matter how little the pressure made by an encircling bandage or bit of adhesive plaster every breath has to overcome or try to overcome the constriction and I am convinced that many a life has been lost on account of this added physical strain.

My dressings are held in place by adhesive plaster and when continuous pressure is needed on the side of the operation I use the elastic plaster of Johnson & Johnson known by the trade name of *Elastikon*. I give the patient plenty of morphine for the first day or two so as to keep the respiratory rate under 30.

The actual shock of an operation of this kind when supplemented by transfusion is not serious enough as a rule to put the patient in danger of his life. We shall give this man fluid in large quantities by mouth and by rectum to make up for the very large quantity of bloody serum which will be discharged through the tube.

Formerly I used intrapleural gauze after performing lobectomy but Dr. Brunn of San Francisco has been using suction in this operation with great success and that is why I have made use of the valve drain here and have omitted all intrathoracic packing. I consider this a distinct advance in the technic of lobectomy.

Let us now take a look at the specimen. I do not wish to mutilate it because it will go to the laboratory for careful dissection but I do wish to know whether we have succeeded in getting behind the tumor. On lifting the bronchus the material which Dr. McEwen saw is easily detached from the bronchial wall and does not appear to be neoplastic in character. Otherwise we are well at the new growth. Dividing the tumor it appears to be encapsulated slightly yellowish in color and is apparently a cystic rather than an inflammatory affair.

Post operative Notes. For more than a week this patient's progress was satisfactory. The blood pressure rose within

be held to the chest wall by means of a large safety pin on the side of the skin. This prevents mediastinal flapping.

Notice how nicely the respiration is maintained by the intrapharyngeal insufflation and how easy it is to expand the remainder of the lung by this method. For drainage I will make a little incision in the tenth intercostal space posterior axillary line and a fairly sized tube (a little larger than an ordinary lead pencil) is drawn through from within the chest with a forceps passed through the little incision. The knot of the ligature with the safety pin is passed out of the upper posterior angle of the wound and the chest is now closed with pericostal sutures of double chromicized catgut. The wound with muscle and fascia suture in two layers partly interrupted and partly continuous. I shall close the wound but not the edges of the skin. Instead I will lay this thin slip of iodoform gauze between the lips of the cutaneous wound and will cover the whole incision with a small wet occlusive dressing using rubber dam to cover the small white gauze externally.

I do not believe in great bulky dressings. When the patient is in his bed he will lie upon a soft pad which will take up the discharge and which the nurse will at all times be able to change whether or not bleeding goes on. With the usual head dressing profuse hemorrhage may occur before it is noted from without. You will observe that I have inserted my drainage tube rather long, extending 6 or 7 inches away from the chest wall. This will be clamped with forceps for the present in order to prevent the more serious effects of air. As soon as the patient is in bed an extension piece will be added to this tube. Instead of the watertight seal I am now using a seal made of an ordinary thin finger cot—not a glue tin—and when I have tied the finger cot to the tube the distal end of the cot is lit with scissors. With every expiration air and fluid will pass out of the tube. With inspiration the walls of the finger cot will come together and prevent pneumothorax. This is an adaptation of the valve described by Thursfield many years ago.

Our patient is in good condition but the operation as you see has consumed more than an hour and Dr. Nathan R. Smith

left lung which had been examined *postmortem*. Besides the tumor in the right lung there was a tiny nodule in the upper lobe of the healthy or better lung of exactly the same type as that which I had removed. Dr. Klemperer did not believe that this left-sided tumor was a metastasis from one lung to the other first because this is rare and secondly because the



FIGURE 1. (a) Gross specimen of the right lung showing a large, dark, irregularly shaped mass (tumor) on the surface. (b) Gross specimen of the left lung showing a small, dark, irregularly shaped mass (tumor) on the surface.

metastatic type of infiltration and metastatic tumor are always sharply circumscribed. His conclusion was that we were dealing with two separate primary tumors of identical type in this individual.

Regarding the cause of both there was no edema of the lung but it had a considerable amount of emphysema. The

forty eight hours to 145/67. The joint pains disappeared. For six days there was no dyspnea and no cyanosis. It was to be expected that there would be infection from the bronchus and this showed itself as the sanguinolent drainage fluid gradually became purulent. On the sixth day the temperature rose to 104 F and a rattling appeared in the chest which sounded edematous to me. This was the beginning of the end.

Without going into minute detail I will say that by the morning of the ninth day a sudden collapse occurred and a little blood appeared from the tube. I therefore took the patient once more to the operating room gave him a little nitrous oxide and reopened the wound putting the rib spreader. The upper lobe was found firmly adherent everywhere to the chest wall and showed normal respiratory motion. The diaphragm had risen so high in the chest that the pleural cavity was not larger in bulk than an adult fist. The ewing lymphatic stump but no blood. The waning pupose. The bronchus was not yet open. The entire pleural cavity was so saturated that the rib spreader was quickly removed and the wound firmly trapped. The blood clotted. The patient was not shocked and did not take more than fifteen minutes and the patient was not shocked.

The nose with the left chest continued however the pulse gradually became weak and the patient died nine full days after his operation.

A postmortem examination made by Dr. Pulaski. The specimen slides were demonstrated by him to me in the Blumenthal Auditorium at Mt. Sinai Hospital by the use of Zeiss projector. The minute details were beautifully thrown upon the screen so that the specimens could be shown as they were manipulated cut and turned about and the great magnification showed most of them as if they were of a colored motion picture with rapid and perfectly effected.

Dr. Klemperer described the growth as a papillary tumor sharply circumscribed carcinomatous type and predominantly composed of anaplastic epithelium. The surrounding lung showed no gross changes. The first specimen was that of the lower lobe of the right lung (F. 193) and the ewings also the

left lung which had been examined *postmortem*. Besides the tumor in the right lung there was a tiny nodule in the upper lobe of the healthy or better lung of exactly the same type as that which I had removed. Dr. Klemperer did not believe that this left lobe tumor was a metastasis from one lung to the other first because this is rare and secondly because the



Fig. 1. Section of the lung showing the tumor mass. (The tumor is in the upper lobe.)

microscope revealed infiltration and metastatic tumor are always hardly discernible. The conclusion was that we were dealing with two separate primary tumors of identical type in this individual.

Regarding the cause of both there was no edema of the lungs but instead a considerable amount of emphysema. The

right upper lobe was covered with a fibrinous plastic exudate such as is usually found in the neighborhood of an operative field. The middle lobe showed collapse. The opposite lung was markedly emphysematous. There were diffuse bronchitis and patches of bronchopneumonia. This patient evidently developed bronchitis with collapse of the right middle lobe bronchopneumonia on the opposite side and finally insufficiency of the already hypertrophic right ventricle.



Fig. 104—Microscopic section demonstrating alveolar tissue filled with carcinoma.

It appeared that the material removed by Dr. Myerson through the bronchoscope was indeed not neoplastic nor new or anized tissue. The operation had removed the entire cancer of the right lung. Had this patient received the other carcinoma in the left upper lobe would still have been present and in its further development would have threatened the patient's life.

Now a few words as to the histogenesis of this type of carcinoma. Dr. Klemperer has stated that it is difficult to reco-

nize the actual origin of lung tumors and has proposed a simple gross classification (1) tumors located in the hilum (2) tumors located within the lung parenchyma

The first may originate from the surface epithelium of a bronchus or from the mucous glands or their excretory ducts. The second type may originate either from a small bronchus or bronchiole and finally from alveolar respiratory epithelium. Tumors originating in the bronchial structure are not difficult of diagnosis but those located within the lung parenchyma may be extremely hard to interpret. Doubt has been cast upon the existence of actual respiratory epithelium and it has been stated that the alveoli of the lung are devoid of epithelium. In the field which is here presented (Fig. 194) you will find large alveoli lined by very irregular tumor cells—a picture strongly suggesting that these structures are actual irregular pulmonary alveoli.

AVULSION OF LEFT PHRENIC NERVE FOR TUBERCULOSIS OF LUNGS

We have to lay a case which may prove embarrassing to the operator and a disappointment to the patient. The conditions are unusual. This lady, Miss J. S., more than thirty years of age, was referred to me by Dr. Paul Ringer of Asheville, N. C. It is hardly necessary to go into the detail of her tuberculosis, which she knows she has had for about four years. The x-ray film which I have fastened to this window pane with a black rubber band will show you the picture (Fig. 195).

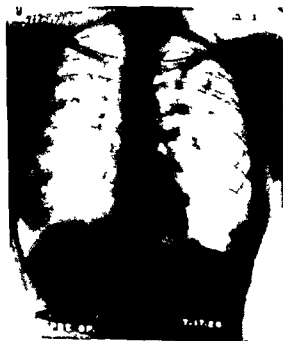
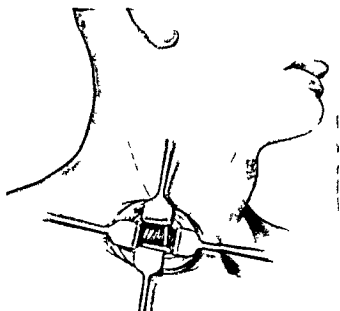


Fig. 1. Left lateral view of chest showing extensive tubercular lesions of the lungs. The left phrenic nerve is visible.

The patient first wrote to me stating that her case had been a very peculiar one and asking whether I thought I could identify and divide the nerve. In the pride of former successes I wrote that while I was not sure still I had thus far never failed to find a phrenic nerve. Now it so happened that the day after I had written this letter I encountered my first failure and I am inclined to think that in this instance the patient had no demonstrable phrenic nerve.



I find that this sound a little excited but I am not entitled without experience. For example in the case I worked for I cut the phrenic nerve over the pericardial border of the left internal mammary artery in all the regions where there is a possibility of its being there. Next day the patient was taken to the operating room and I began

vious surgical invasion but to make use of the method which I have employed for several years—one which promises more certain if perhaps more difficult access to the phrenic nerve. Instead of describing my method let us proceed at once demonstrating by the operation itself.

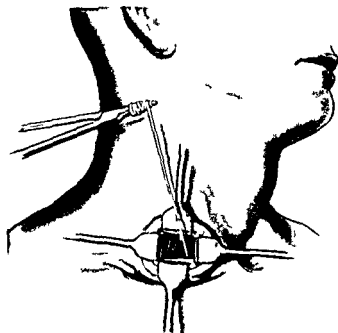


FIG. 19. 17. The avulsion of the left phrenic nerve. The nerve is shown being pulled away from the chest wall.

Our patient appears to be a little nervous. I do not blame him. On the contrary, I think he is very brave to be willing to go through such a performance of this kind with a fair possibility of repeated failure. We will free the point for the first needle penetration with a gross ethyl chloride anæsthesia. You see the fine hypodermic needle passes into the skin with no sensation. From now on it is my fault if I hurt the patient.

Proceeding from anæsthesia to the next I benumb the skin, using the lavale for about 15 inches with the pos-

systematically looking between the fibre bundles of the anterior scalene muscle where I encountered the nerve characteristic in appearance within the substance of the muscle itself. I avulsed it and produced a typical well marked elevation of the left diaphragm.

In another case the only nerve I could find in the place where the phrenic ought to be lying upon the scalenus anticus muscle was a structure not larger than a rather fine horse hair.

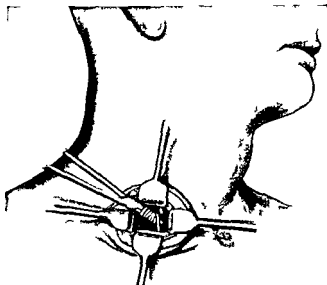


Fig 198—Phrenic nerve lying on the scalenus anticus muscle.

I divided it and took it the first time on the lower extremity. The patient however was followed by complete paralysis of the corresponding diaphragmatic dome. Other anomalies have been encountered by me and although the great majority of cases show little trouble in locating the structure the surgeon must always be prepared for a task much more difficult than he expected.

My idea in this case is not to operate in the field of the pre-

vious surgical invasion but to make use of the method which I have employed for several years one which promises more certain if perhaps more difficult access to the phrenic nerve. Instead of describing my method let us proceed at once demonstrating by the operation itself.

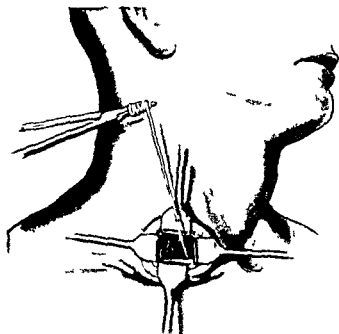


Fig. 1. The phrenic nerve, showing the point of avulsion.

Our patient appeared a little nervous. I told him that on the contrary I think he is very brave to be willing to go through a successful performance of the kind with a fair prospect of cure. We will freeze the point for the first needle penetration with spray of ethyl chloral and you see the ethyl chloral needle passes into the skin with no sign of sensation. From now on it is my fault if I hurt the patient.

I next get my anesthetized area to the next I benumb the skin along the clavicle for about 2 inches with the pos-

terior border of the sternomastoid muscle almost at the center of the proposed incision. With a sharp scalpel I cut down upon the bone making my incision about 1 inch in length. My assistant raises the upper edge of the wound with a small sharp retractor and I dissect this part of the skin and platysma upward and away from the part beneath. My object is to reach what is known as the subclavian triangle which is bounded below by the clavicle above by the obliquely running posterior belly of the omohyoid and internally by the posterior border of the sternocleidomastoid. Another assistant with a blunt retractor draws the muscle forward slowly and carefully and directs with Mayo's blunt cursor I expose the omohyoid muscle.

The assistant now changes his sharp retractor for a blunt one and takes this muscle together with the skin flap into the grasp of the retractor and draws upward. Getting rid of a little fat and one or two small lymph nodes here the gravish fascia covering the scalenus anticus muscle is elevated. You have observed that during this apparently simple and for the most part blunt dissection I have worked very slowly and that it has been necessary to ligate a few tiny vessels which we do not ordinarily find in this region. Still we must recall that anomalies are probably present in this case otherwise the nerve would have been found at the former operative procedure. We must also be particularly careful not to work so roughly that the esophagus be damaged especially on the left side of injury to the thoracic duct before it enters the internal jugular or the subclavian vein. If this accident should happen it is not so serious as one might be led to believe for a little gauze packing for a few days will permanently check the flow of lymph. I indicated to you such as we find in carcinoma of the subclavicular region around the duct is a serious matter for the indurated structures hold the wound led duct patent as I have seen one patient who died of starvation because he lost so much of the fluid from the lacteal system.

We must also be particularly careful not to wound the venous structures in this region though this is a serious danger since the vein is usually heavily innervated. The thyroidea with its

arteries especially the inferior thyroid may also be encountered here if the dissection is made too deep but as you see when once the scalene muscle is found there is no reason for deeper dissection. The principal thing is to keep the field absolutely dry and all structure easily identifiable by sight. I am searching the entire width of this muscle for the nerve and I do not see it. That I have encountered my second failure but before giving up we will expose the mesial edge of the muscle by blunt dissection.

Still no nerve

Now going a little further toward the midline I see a nerve but instead of it being straight as the normal phrenic nerve always is it is actually serpentine resembling Hogarth's line of beauty. Normally the nerve would be straight and it is the only nerve at this level in the ul clavian triangle. Also it lants toward the midline while the other nerves outside the triangle run slightly away from the midline. The usual size of a phrenic nerve is a little larger than the graphite in a mechanical pencil. This nerve is fully the size of the graphite in a wooden pencil. You see that that we are now outside the anatomic mesial boundary of the ul clavian triangle. The phrenic nerve often lies well to the inner contour of this triangle and it is not infrequently necessary to raise the internal jugular vein away from the underlying structures exposing the nerve. Indeed the pneumogastric nerve has often been taken for the phrenic and it has been divided although usually with disastrous result. In one case operated upon last year the surgeon not through this incision but over the axillary artery divided in fact of the phrenic with the fatal result of narrowing of the palpebral fissure and the irregular intermittent flow of secretion of the nerve.

While I am talking I am wondering what I shall do in this case and it strikes me that in order to be perfectly sure I will inject a drop of novocain and then of alcohol into the nerve here. We will then put temporary respiration goggles on the patient and we will examine the respiratory department by fluoroscopy. I am not finding the phrenic. The point of the nerve I have passed is at least a gut around it in the end I beg

(*In the x-ray room*) This girl is certainly a cool and ideal. Considering that she is said to be nervous. I think she has more nerve than would many a man. She didn't mind the little trip on the stretcher into the dark fluoroscopic room in the basement and here she is lying upon the tilted table of the apparatus. Dr. W. Benjamin who is in charge today raised the table almost to the vertical position and turns on the current.

Now then take a deep breath! As the patient responds there is a beautiful and instantaneous demonstration of what is known as paradoxical respiration. On deep inspiration the diaphragmatic domes of the inflated sides rise while the normal one is depressed and we are certain that a paralysis of the left diaphragm has occurred. So let us return to the operating room.

(*In the operating room*) After the little intermission the dressings are again removed and by traction upon the protruding end of the catgut the nerve is instantly found. I divide it as far up as I can reach and then grasp the lower end with a clamp making it act on a d. reel, lay the nerve upon the clove blade of the forceps. The patient complains of a painful sensation in the neighborhood of the epigastrium and cardiac region but this is usually easily borne. Very slowly and with firm traction the nerve is reeled upon the forceps until something like a foot and a half of the nerve come away.

I have often succeeded in extracting from 10 to 14 inches of nerve tissue in this manner but 4 or 5 inches below the clamp is all that is essential and will take care of any accessory fibers. We now close this wound with metal clips and lay a pad upon the suprascapular region holding it in place with Elastikon (elastic adhesive plaster).

Taking time out as they do in football games the elapsed operative period has been about twenty minutes. In a perfectly normal case ten minutes would have been sufficient.

Postoperative Notes—A little superficial infection occurred in this case possibly because of some break in the skin connected with the transportation of the patient but healing is a foregone conclusion. The deep part were not involved and the patient left the hospital within ten days.

Concerning the preoperative and postoperative pictures (Figs 125-126) it is seen that we have gained something although not a great deal by the paralysis of the diaphragm. I should say the equivalent of about 250 c.c. of pneumothorax. It seems to me that this patient with her other lung in such excellent condition would do well to submit to a thoracoplastic operation and I trust that she will have this done before the other lung becomes more affected by the disease.

CLINIC OF DR CHARLES H CHITWOOD

IRVING HOSPITAL

THE IMPORTANCE OF MODERN TECHNIC IN CORRECT RENAL DIAGNOSIS

With the successful mechanical development of the cystoscope it has become the main reliance of modern urologic diagnosis. But the conclusions drawn from vision alone are often unreliable and deceptive. For example the visual manifestation of the interior of the bladder may afford to the observer a satisfactory explanation of clinical symptoms. But the condition observed may be of secondary nature while the primary and main causative lesion is higher up in the urinary tract. Thus have been standardized as essential to complete diagnosis catheterism followed by the functional urinary test, the laboratory examination of urine and finally the combined investigation with roentgenology that has developed uroteropyelography.

It is not alone the skillful employment of these methods that is important but their proper application to each case along established lines which has given to the requirement of urology its high technicality of a urologic diagnosis. This sometimes means that going to the very well and neglecting the necessary means to get the diagnosis. The principal lesson is that the only guarantee for a perfect diagnosis is to start with a cystoscopy and not to cut nor to fluctuate to do so. As a further requirement of medicine that which saves the valuable modern technic from the discredit of being misused is the intelligent knowledge and experience topped off with the great skill that has been formed out of these. The importance

of this work makes a most interesting

Pain is often confusing and misleading

Manual physical examination is not conclusive

Put the urine is always a noteworthy indicator but its source must be determined accurately as we know that it may come from any part of the upper or lower urinary tract

Hematuria is equally important and must be located at its source

An incomplete investigation can determine its cause for there is a pitfall that will deceive and cause chagrin if the possibility of their existence is not kept in view

In brief therefore it is the careful working up of a case that leads to accurate diagnosis and fits that to justifiable confidence at the operating table which is a potent aid to the surgeon himself also. It is the purpose of this article to advance illustration of

1. Satisfactory differential diagnosis

2. Faulty operative procedure precipitated by inadequate diagnosis

3. The fallacy of too academic method in diagnosis which may lead to wrong treatment

I. A Case of Differential Diagnosis: Comparison Between Early and Late Recognition—J. G. Malins admitted to the Finch Hospital No. 12, 1978, discharged November 17, 1978

Preoperative Clinical Synopsis—Patient with left lower abdominal colicky pain. For the past 2 years this pain has been sharp and shooting in character intermittent in occurrence occasionally accompanied by vomiting and burning urination

Examination—Palpation of the abdomen is soft but the lower pole of the left kidney is enlarged

Cystoscopy and X-Ray—Both undertaken without difficulty

Notes—The cause of the urinary tract infection is unclear. The kidneys are normal in size and position. Film was also made of the left kidney following partial withdrawal of the catheter and injection with sodium diatrizoate. A study of

the x film showed a bend of the ureter (fig. 200) at about the level of the second lumbar vertebra which in a condition of torsion would be destructive and provocative of painful symptoms. The outlines depicted by the ureteropyelogram in this picture are otherwise normal.

Postoperative examination of the catheterized specimens. Right: occasional leukocyte only; a moderate number of epithelial cells; left: few leukocyte.

Summary. The clinical symptoms in this case are characteristic of renal or ureteral lithiasis; namely, pain paroxysmal



Fig. 200. Ureteropyelogram showing a calculus in the ureter.

symptoms, a fluctuating urination. A negative plain abdominal x film was obtained by x-ray examination and ureter catheterization. The abnormal angulation in the ureter furnished a explanation for the clinical picture. In any examination of the kidneys from any cause would result in the formation of a tract with retention and all of the symptoms that come with passage or presence of a urinary calculus. The patient is relieved by the absorption of a proper quantity of mineral salts to which mineral water is added as a source of mineral elements. This case demonstrates the

Pain is often confusing and misleading

Manual physical examination is not conclusive

Pain in the urine is always a noteworthy indicator but its source must be determined accurately as we know that it may come from any part of the upper or lower urinary tract

Hematuria is equally important and must be located at its source

No incomplete investigation can determine its cause for there is a pitfall that will deceive and cause chagrin if the possibility of their existence is not kept in view

In brief therefore it is the careful working up of a given case that leads to accurate diagnosis and after that to justifiable confidence at the operable level is potent aid to the surgeon's self-reliance. It is the purpose of this article to advance illustrations of

1. Six factors different diagnosis

2. Faulty operative procedure precipitated by inadequate diagnosis measures

3. The fallacy of too academic method in diagnosis which may lead to wastage of time

I. A Case of Differential Diagnosis: Comparison Between Early and Late Recognition—A 60-year-old male admitted to the Feuchtmann Hospital November 12, 1978 discharged November 17, 1978

*Present Clinical Synopsis—*Patient the left lower abdominal quadrant. For the past 10 years the pain has been sharp and shooting in character, intermittent, occurs occasionally accompanied by vomiting and burning urination.

*Examination—*Physical examination elicited no left paravertebral tenderness but the lower pole of the left kidney is felt.

*Cystoscopy and X-Ray—*Both urinary catheterized without difficulty.

No evidence of bilateral ureteral calculi. The kidneys are normal in size, shape and position. Film also made of the left kidney following partial withdrawal of the catheter and injection with sodium iodide solution. A study of

nefro is in this case which was of two years standing amounted to over 100 c.c. The necessity for a plastic surgical procedure to correct this advanced condition might have been obviated by earlier diagnosis.

II A Case Affording Example of Incomplete Preliminary Diagnosis Leading to a Prolonged and Complicated Situation

A.C. (female) was admitted to the hospital on March 25, 1928, with a temperature of 101° F. Her blood count was: Red blood cell 4,580,000; white blood cell 13,300; polymorphonuclears 51 per cent; lymphocytes 43 per cent; hemoglobin 80 per cent. The urine on a filtration showed an acid reaction, specific gravity 1020 and a small trace of albumin, otherwise negative.

Principal Complaint. Pain in the right lower quadrant of the abdomen radiating to the back centrally occasionally in the left side of even month duration. The pain is sharp and more or less continuous.

Initial Diagnosis. Chronic appendicitis and uterine retroversion.

Operation. March 26th. Appendectomy and ventral uterine pexy. A chronically inflamed and adherent appendix being removed. Twenty-four hours after operation the nocturnal temperature was 100° F. and continued high ranging between 101° and 104° F. Although a severe infection was detected in the wound at a subsequent day.

April 5th ten days after operation the blood count showed white blood cell 12,200; polymorphonuclear 4 per cent; lymphocytes 6 per cent. The urine which had remained negative until this time revealed many leukocytes with occasional red blood cells and mucous. On account of this urinary evidence a diagnosis of pyelitis was made. A ureterogram and x-ray investigation was undertaken.

Course of Examination. April 6th. Bladder normal. The uterus, catheterized. Left ureter clear right thick and tortuous. Mucous excretion bowel many pus cells. Functional test by intravenous phenylhydralin injected in left leg appeared in five minutes in return in right leg in fifteen minutes.

efficiency of present day diagnostic technic in contrast to the ancient cruder method of exploratory operation.

The importance of early and correct diagnosis is better appreciated by contrasting this case with another of more advanced degree (Fig. 201). In the first case early diagnosis recognized the condition before the stage of encroachment upon the calyces and kidney structure had been reached and also



Fig. 201.—Thick first calyces hyd. phos. d. p. calyce

permitted the employment of a simple and conservative course of treatment in place of a major surgical procedure involving possibly nephrectomy. It will be noted by inspection that in the first case there was no dilatation of the pelvis or distortion of the calyces, no hydronephrosis, while in the second or contracted picture (Fig. 201) there is marked distention of the pelvis with partial obliteration of the calyces. The hydro-

nephro is in this case which was of two years standing amounted to over 100 c c. The necessity for a plastic surgical procedure to correct this advanced condition might have been obviated by earlier diagnosis.

II A Case Affording Example of Incomplete Preliminary Diagnosis Leading to a Prolonged and Complicated Situation —

A C (female) was admitted to the hospital on March 25, 1928 with a temperature of 101° F. Her blood count was: Red blood cell 4,580,000; white blood cell 13,300; polymorphonuclears 51 per cent; lymphocytes 43 per cent; hemoglobin 80 per cent. The urine on a lamination showed an acid reaction, specific gravity 1026 and a small trace of albumin, otherwise negative.

Principal Complaint — I am in the right lower quadrant of the abdomen radiating to the back centrally occasionally in the left side of seven months duration. The pain is sharp and more or less continuous.

Preliminary Diagnosis — Chronic appendicitis and uterine retroversion.

Operation — March 26th. Appendectomy and ventral suspension. A chronically inflamed and adherent appendix being removed. Twenty-four hours after operation the nocturnal temperature was 102° 6 F and continued high ranging between 101° and 104° F. Nothing adverse was detected in the wound area in explanation.

April 5th ten days after operation the blood count showed white blood cell 17,900; polymorphonuclear 4 per cent; lymphocyte 76 per cent; the urine which had remained negative until this time revealed many leukocytes with occasional red blood cells and mucus. On account of this urinary evidence and the general picture of cephalic urologic and x-ray investigation was undertaken.

Cystoscopic Examination — April 6th. Bladder normal both ureter catheterized. Left urine clear, right thick and turbid. Microscopic examination showed many pus cells. Functional test by intravenous phenolphthalein injection left side appeared in five minutes, right return from right side in fifteen minutes.

efficiency of present day diagnostic technic in contrast to the ancient cruder method of exploratory operation.

The importance of early and correct diagnosis is better appreciated by contrasting this case with another of more advanced degree (Fig 201). In the first case early diagnosis recognized the condition before the stage of encroachment upon the calyce and kidney structure had been reached and also



Fig 201—Transverse section of the pelvis showing hydronephrosis of the calyce.

permitted the employment of a simple and conservative course of treatment in place of a major surgical procedure involving possibly nephrectomy. It will be noted by inspection that in the first case there was no dilatation of the pelvis or distortion of the calyces, no hydronephrosis, while in the second contrasted picture (Fig 201) there is marked distention of the pelvis with partial obliteration of the calyce. The hydro-

life. The subsequent conservative course was demanded by the previous circumstances.

III. A Case of Overzealous Medical Intervention.—Z. C. female, age seventy. This patient has been under observation for a number of years in Europe as well as in this country. The principal clinical symptom has been a bacteriuria with a moderate amount of pyuria, a subject of *trophieusism* to the colon bacilli group but well controlled by dietary restrictions and general hygiene. In August 1928 the patient visited one of the prominent physicians in Europe where according to custom she followed



FIGURE 1. Patient Z. C. (left) and patient G. H. (right) before treatment.

the custom of drinking excessively the strong saline mineral water. During this period he suffered an acute attack of pain in the right lumbar region accompanied by an acute febrile reaction and the violence of urinary excretion.

The attack subsided under rest, the administration of diuretics and internal urinary antiseptics. Following the acute exacerbation patient was submitted to a complete investigation

Roentgen Findings—A single ring type calculus is revealed in the upper right quadrant and a diagnosis of chronic gall bladder with one partially calcified and a number of non-calcified stones. Urologic films show enlargement of the right kidney pelvis with some destruction of the kidney substance.

Second Operation—April 14, 1928. Right lumbar incision, nephrotomy. A large quantity of purulent urinous fluid is drained from a greatly dilated renal pelvis that had encroached upon the normal parenchymal substance with much loss of structure. An attempt is made to remove the kidney.

Through the drainage tube inserted at the time of operation daily lavage of the renal pelvic cavity is conducted. The patient made a slow but satisfactory recovery from operation and was discharged June 12, 1928.

Summary—This case demonstrates an incomplete and faulty preliminary diagnosis leading to an operation that may have been necessary but which did not strike at the principal point of trouble. It would seem that following the primary operation for removal of appendix and ectopic thyroid gland, which were then infected, the kidney was previously infected and that there also pre-existed gall bladder disease accompanied by calculus. It was not possible at the time of the second operation to do other than a conservative procedure to relieve the patient of sepsis which had been accomplished. It was intended at a later date to remove the diseased kidney subject to the clinical course in connection with the gall bladder condition.

On June 17, 1928, patient was readmitted for observation when although the condition was much improved and he had been in weight since it was not sufficiently good to warrant further urologic intervention of possibly considerable magnitude.

Last report (September 23, 1928, six months after operation). Patient reports he feels well and has no complaint.

While the report of the treatment of this case does not embrace the period of complete removal of the infective morbid condition, it does demonstrate that if the operative intervention is followed by the removal of the cause of the patient's

fragment having disappeared (Fig 20b) The kidney pelvis was treated by lavage with nitrate of silver and no unfavorable reaction followed this examination

December 10 1928 the urine was clinically clear The specimen obtained from the bladder contained some pus cell The right ureter was catheterized and specimen obtained Microscopic examination revealed no pus cell



Fig. 20—1. Left. 1. 1. 6. 1. pel. 8.

February 1929 the right ureter was again catheterized and specimen obtained which showed a few pus cell from the bladder but no pus cells were found in the kidney specimens

Summary This case demonstrates the questionable course of following a routine method too faithfully for the treatment of a condition that is dominant especially in the case of an individual of advanced years where a more conservative course would be safer In this instance the patient had undeniably for

(in Europe) that resulted in the discovery of a small calcareous body in the region of the right kidney pelvis (Fig 202) and another calcareous mass in the region of the bladder. The one in the kidney seemed to be composed of two portions—a small one on top of a larger.

Phonographic bougie picture (Fig 203) confirmed the existence of the calcified body in the right kidney pelvis region but



Fig 203.—Same as Fig 202. Phonogram.

indicated that the lower calcified body was either a litho or a stone in a pelvic gland.

November 28, 1928, the patient having returned to this country, was submitted to cystoscopic examination with catheterization of the right ureter. When x-ray pictures of the right kidney (Fig 204) with phonographic catheterization confirmed the existence of the calcified body in the region of the kidney pelvis and when compared with the previous films revealed a loss of structure of the calcified body, the upper or middle

fragment having disappeared (Fig. 205). The kidney pelvis was treated by lavage with nitrate of silver and no unfavorable reaction followed this examination.

December 10, 1928, the urine was clinically clear. The specimen obtained from the bladder contained some pus cells. The right ureter was catheterized and specimen obtained. Microscopic examination revealed no pus cells.

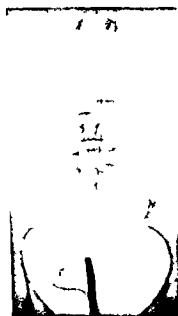


Fig. 205.—Right ureter, left kidney, and bladder.

February, 1929, the right ureter was again catheterized and specimen obtained which showed a few pus cells from the bladder but no pus cells from the kidney specimens.

Summary.—This case demonstrates the questionable course of following a routine method too faithfully for the treatment of a condition that is formant, especially in the case of an individual of an advanced year, where a more conservative course would be safer. In this instance the patient had undeniable for

many years been the subject of calcareous formation in the upper urinary tract and lower pelvis that had produced no active symptoms. Following the institution of copious quantities of strongly alkaline mineral water a portion of the calcareous formation in the kidney became detached and was expelled acci-



Fig. 20 — m. Fig. 04 h e e m h l t

panied by a violent kidney attack. Following the subsidence of this exacerbation the patient resumed his previously uneventful clinical course, thus justifying the conservative method of non-interference with the latent kidney condition.

CLINIC OF DR WILLIAM B. COLBY

HOSPITAL FOR RUPTURED AND CRIPPLED

SARCOMA OF THE LONG BONES CLINICAL LECTURE ON END RESULTS

EXHIBITION OF PATIENTS ILLUSTRATING END RESULTS OF TREATMENT

Case I Periosteal Osteogenic Sarcoma of Tibia Involving 6 Inches of Shaft with Extensive Metastases in the Femoral Inguinal and Iliac Glands Treated with Toxins and Radium Complete Recovery Limb Saved Patient Well Twelve Years Later (S. male aged thirty nine years first came under my care in March 1917 referred by Dr John H. Gibbon of Philadelphia) While in this case the microscopical diagnosis of osteogenic sarcoma made by Dr F. wing was confirmed by the Committee of the Bone Sarcoma Registry (registered as Case No. 183) personally I am inclined to regard it as an endothelioma or lining tumor. In the first place the case was treated in 1917 some year before Dr F. wing had recognized the plurivariety of bone tumor. The tumor had originated in the shaft of a long bone. It was characterized by little or no new bone formation. The roentgen ray showed a non-lithic simulating what we later came to recognize as the endothelial type of sarcoma. It was associated with early and extensive glandular metastases—a feature rarely observed in osteogenic sarcoma but not infrequently seen in the endothelial type. Finally what might be offered as still further proof of the

The following members of the Royal Society of Medicine (Surgical Section) at the Hospital for Ruptured and Crippled, September 20, 1917, attended: American Journal of Surgery, February 19, 1917, presented a complete film of the film on illustration (William B. Colby)

correctness of the latter diagnosis is that the tumor was extremely sensitive to both toxins and radium.

This case is of special interest inasmuch as it is the only registered case of periosteal sarcoma in which the limb was saved and the patient remained alive for a period of more than five years. Furthermore it is the only case in the Bone Sarcoma Registry in which a patient with metastases has been cured by any method of treatment with the exception of 2 other cases of my own series that have emanated well for one and eight years respectively, both of which were treated with toxins and radium.

Later Note—The patient is well to present May 1929 twelve years later.

Cas. II—Very Extensive Inoperable Sarcoma (Clinical and x-ray Diagnosis) Involving the Middle and Upper Third of the Shaft of the Femur Treated with Toxins and Radium. Recvery Reunion of Pathologic Fracture. Limb Saved. Patient Well Ten and One-half Years Later.—R. H. male aged thirty-six years came under my care in October 1914 referred by Dr. Louis Fisher, New York. He had a rapidly growing tumor of the femur (following a recent fracture) which had completely destroyed 5 inches of the bone. A pathologic fracture had developed and the condition was quite beyond hope without amputation. My diagnosis based on clinical and roentgenologic evidence was that of a malignant tumor probably of the endosteal type.

The patient was shown that afternoon to the Memorial Hospital in October 1914 and in the previous fall the condition was one of malignant bone tumor. He was treated with injection of the mixed toxin of erysipelas and Bacillus prodigiosus for eight months and in addition he received on an average 40,000 millicurie hours treatment. During this long period of treatment the case remained in the mind of the staff of the Memorial Hospital that this was a highly malignant sarcoma and I was frequently criticized for keeping a bed occupied by such a hopeless case. At the end of eight months the

marked improvement in the condition as shown by diminution in the size of the tumor and partial regeneration of bone. The patient was fitted with a Thomas splint and allowed to go home. At the end of four months the tumor had apparently entirely disappeared and there was firm union of the bone. The splint was discarded and a high shoe was substituted with which as it will be seen the patient gets about very comfortably. He has been doing full time work in a machine shop the past ten years.

While the diagnosis of the Committee of the Bone Sarcoma Registry (see Case 210) was that of chronic inflammation. I believe this is a case in which the clinician who has the patient under constant observation and who sees repeated roentgenogram of the condition is better able to make a correct diagnosis than a committee who in the present case at least had nothing but brief clinical note and one very poor roentgenogram upon which to base their judgment.

Later Note. The patient is in good health at the present time April 1929 eleven and a half years later.

Case III. Periosteal Sarcoma of the Fibula Endothelioma Type (Ewing Tumor) with Extensive Metastases in the Femoral Inguinal and Ilac Glands and Probably in the Lungs. Treated by Amputation Toxins and One Radium pack Treatment Complete Recovery Patient Well Nine Years Later.—A male aged eight years was first seen by me in consultation with Dr. Royal Whitman in May 1920. Examination revealed a large fungating tumor of the tibia involving one half of the shaft with extensive metastases in the gland of the groin. I advised an immediate amputation which was performed by Dr. Armitage Whitman. The patient was then referred to me for prophylactic toxin treatment. I removed one of the glands in the inguinal region and submitted it to Dr. Livingston for microscopic examination. He stated that it presented the same histological structure as the original tumor (endothelioma (Ewing sarcoma)).

In October 1930 a large tumor the size of a child's head

developed in the iliac fossa and one radium pack treatment (10 000 millicurie hours) was applied over this region. A roentgen ray report made by Dr. Herendeen at this time stated that there was definite evidence of pulmonary metastasis. However, no radiation of any kind was applied over the chest. The



Fig. 206—Case III. End of right leg amputated by the femoral artery. The patient had a complete recovery of the right leg after the amputation. The patient had a complete recovery of the right leg after the amputation. The patient had a complete recovery of the right leg after the amputation.

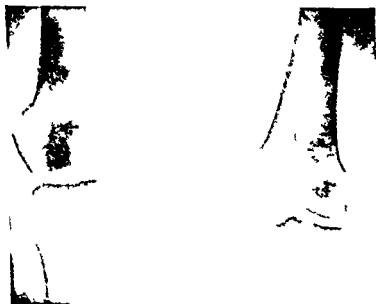
to the treatment was continued for months after the amputation. The patient made a complete recovery of the right leg at the present time. Later, a roentgen ray examination taken in August 1921 showed that the right breast had developed as pulmonary metastasis had entirely disappeared and I am relieved that the

that we may have been mistaken in believing that there were metastases in the lung.

The diagnosis of the Bone Sarcoma Registry (cc Case No 164) was that of Ewing type of sarcoma.

Later Note—The patient is well at the present time May 1939 nineteen years later.

Case IV Central Tumor Giant and Spindle-cell Sarcoma of the Entire Lower End of the Femur with Extensive Involvement of the Knee joint Biopsy Performed Without Curettage Recovery Under Toxin Alone Patient Well Fourteen Years



1930 Case IV Central Tumor Giant and Spindle-cell Sarcoma of the femur with extensive involvement of the knee joint Biopsy Performed Without Curettage Recovery Under Toxin Alone Patient Well Fourteen Years

Later—The female aged nineteen years was first seen by the physician in consultation with Dr. Virgil E. Gibbons in October 1914. She performed a biopsy and then gave the patient a further course of

developed in the iliac fossa and one radium pack treatment (10 000 millicurie hours) was applied over this region. A roentgen ray report made by Dr Herendeen at this time stated that there was definite evidence of pulmonary metastasis. However no radiation of any kind was applied over the chest. The



Fig. 66—Case III. Edema of the lower leg and foot, following amputation of the right leg, treated by radium pack. Recurrence of edema after removal of the pack.

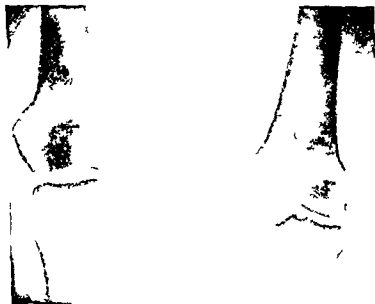
to the time that continued for four months after the amputation. The patient made a complete recovery and well at the present time nine years later. A roentgenogram taken in August 1921 showed that what had been said to be pulmonary metastasis had not appeared and I am inclined to think

that we may have been mistaken in believing that there were metastases in the lung.

The diagnosis of the Bone Sarcoma Registry (see Case No 267) was that of Ewing type of sarcoma.

Latest Note—This patient is well at the present time May 1929 nine years later.

Case IV—Central Tumor Giant and Spindle cell Sarcoma of the Entire Lower End of the Femur with Extensive Involvement of the Knee joint. Biopsy Performed Without Curettage. Recovery Under Toxin Alone. Patient Well Fourteen Years.



1. 0. Case IV (Central Giant and Spindle cell sarcoma of the lower end of the femur with extensive involvement of the knee joint). Biopsy performed without curettage. Recovery under toxin alone. Patient well fourteen years later.

Later this female, aged nineteen years, was first seen by me in consultation with Dr. Virgil I. Cliney in October 1914. I performed a biopsy and then gave the patient a prolonged

course of toxin treatment with occasional intervals of rest. Result: Complete recovery. Limb saved 2 inches shorter of bone and stiff leg; no support of any kind required. The patient is in excellent condition at the present time fourteen and one-half years later.

In this case there have been many differences of opinion concerning the diagnosis. Dr. Ewing's diagnosis at the time the biopsy was performed was that of giant and spindle cell sarcoma of moderate malignancy. Section was examined by a number of pathologists including Dr. Francis C. Wright, Wood and Davis.



Fig. 208.—Case IV. Three years from time began. Limb saved. Now completely formed by prosthesis.

MacCarty and Boders of the Mayo Clinic, all of whom pronounced the condition to be malignant. The diagnosis of the Bone Sarcoma Registry Committee (see Case No. 180) was that of benign giant cell tumor. However, my own opinion has been based chiefly upon the clinical evidence of a tumor of fairly rapid development which had involved the whole limb.

end of the femur and knee joint is that this tumor was of a more malignant type than is the so called benign giant cell tumor. Granting that the latter diagnosis is correct I know of no similar case in medical literature with such extensive involvement that has been cured by anything short of amputation.

The later history of this patient is of interest. Five years ago she developed a rapidly growing tumor of the right breast. This was removed and pronounced a carcinoma by Drs. Ewing and Wood and sarcoma by Dr. Jeffries. The patient was given prophylactic toxin treatment and local roentgen ray. There is no evidence of a recurrence at the present time.

Later Note—The patient is still well May 1929.

Case V Central Sarcoma of the Upper End of the Tibia Involving 5 Inches of the Shaft Treated by Curettage Toxins and One Application of the Radium Pack The Patient Recovered with Almost Complete Restoration of Function and is Well at Present Fourteen Years Later—C. F. female aged seventeen years came under my care in July 1915. Amputation had been strongly advised by Dr. Royal Whitman who believed that the limb would be quite useless even if the disease were cured by conservative treatment. I did an extensive curettage following this with tight packing. The wound healed and the cavity filled up without infection. The toxin treatment was begun a few days after the curettage. This was discontinued in January 1918 during a severe attack of grippe. At the end of this time a recurrent tumor was found at the upper inner end of the right tibia at the site of the old sinus. A second curettage was performed followed by a prompt recurrence. One application of the radium pack (12 000 mill curie hours) was made over the site of the tumor and the toxin treatment was kept up for a number of months. The patient is in good health with a useful limb fourteen years later.

In this case Dr. Ewing's original diagnosis was that of typical giant cell sarcoma of epithelioid type and of very moderate malignancy. A microscopic section was submitted to Dr. George Barrie who had made a special study of benign giant cell tumors

course of toxin treatment with occasional interval of rest. Result: Complete recovery, limb saved 2 inches shorter in length of bone and stiff leg, no support of any kind required. The patient is in excellent condition at the present time, fourteen and one-half years later.

In this case there have been many differences of opinion concerning the diagnosis. Dr. Ewing's diagnosis at the time the biopsy was performed was that of giant and spindle cells,coma of moderate malignancy. Sections were examined by a number of pathologists including Dr. Francis Carter Wood and Dr.



Fig. 208.—Case IV. Thirteen years after beginning treatment. Limb saved. Nodules of metastatic deposit.

MacCarty and Boders of the Mayo Clinic, all of whom pronounced the condition to be a malignant one. The diagnosis of the Bone Sarcoma Registry Committee (see Case No. 180) was that of benign giant cell tumor. However, my own opinion based chiefly upon the clinical record is that a tumor of fairly advanced development which had involved the whole lower

and he stated that he believed the condition to be a malignant one. This was the opinion of Dr. MacCarty of the Mayo Clinic



Fig. 211. (C. A. T.) (f. t. m. t.)

Hovee of the Bone Sarcoma Registry Committee (see Case No. 14) has labeled this a benign giant cell tumor.

Case VI. Periosteal Sarcoma of the Femur. Endothelioma Type (Ewing Tumor) Treated with Toxins. Only Temporary Control. Amputation Performed Followed by Prophylactic Toxin Treatment. Patient Well Nineteen Years Later.—H. J. M. I. a child at two years was referred to me by Dr. Joseph A. Blake in December, 1909 for toxin treatment in the hope of averting an amputation. A six-week course of treatment was given during which period the tumor at first showed evidence of diminution in size but later began to increase. Amputation was then strongly urged and performed by Dr. Blake at the Presbyterian Hospital after which the patient was referred back to me.



Fig 209—Case V C d p dl -cell sa rom f ppe h f
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 P t t m d mpl eco ry l mb sa d good d f rtee
 t



Fig 210—Case V Th ee d h lf f beg g f m t
 h compl ge l bo h bo gr f

for prophylactic toxin treatment. This was begun in January 1910 and given in two courses. The patient has remained in excellent condition with no evidence of a recurrence at the present time nearly nineteen years later.

In this case Dr. Ewing's diagnosis of endothelioma (Ewing tumor) was confirmed by the Bone Sarcoma Registry Committee (see Case No. 398).

Pathologic diagnosis (Presbyterian Hospital laboratory): Small round cell periosteal sarcoma.

Case VII—Periosteal Osteogenic Sarcoma of the Femur Treated with Toxins and Radium with Only Temporary Improvement. Amputation Performed Followed by Prophylactic Toxin Treatment. Patient Well Nine Years Later.—H. S. male aged nineteen years was referred to me in April 1920. He was given a brief course of toxin treatment followed by radium pack treatment (a total of 20,938 millicurie hours over two areas at 6 cm distance). The tumor at first showed evidence of diminution in size but it later began to increase and an amputation was performed in August 1920. Prophylactic toxin treatment was given for six months with occasional interval of rest. The patient has remained in good health up to the present time nine years later.

In this case the diagnosis of the Bone Sarcoma Registry Committee (see Case No. 172) was that of osteogenic sarcoma.

Case VIII—Inoperable Sarcoma Endothelioma Type (Ewing Tumor) of Upper Two-thirds of Shaft of Humerus Treated with Toxins and Radium. Reunion of Pathologic Fracture. Complete Restoration of Function. Patient Well Four and One-quarter Years Later.—E. M. male aged forty years was referred to me by Dr. William C. Sheehy and Dr. John B. Dea of Philadelphia in July 1924 for a tumor that had started in a fracture occurring on July 1921. In the opinion of me and those who examined the patient the diagnosis was by disarticulation of the shoulder joint. He was treated with toxin injected directly into the tumor supplemented by radium pack treatment.

ment (10 000 millicurie hours at 7 cm distance over three different areas) another radium pack treatment was given in December 1924. The toxin treatment was resumed by his local physician and kept up for more than two years. In February or March 1925 the patient was able to perform his arduous work.



Fig. 212—Case VIII. F. d. (ho. g. tr. d. k. l. g. t.) f. i. pe. th. d. f. begu. h. ru. pe. bl. t. f. h. t. f. d. Recovery. f. pa. h. l. g. f. t. l. h. perfect f. t. f. e. l.

Fig. 213—Case VIII. T. d. th. d. f. t. tm. t.

as landscape gardener. There was reunion of the pathologic fracture and complete restoration of function. He is well and with useful limb nearly five years later.

In this case the diagnosis of the Bone Sarcoma Registry Committee (see Case No. 596) was that of endothelioma (Ewing's tumor).

for prophylactic toxin treatment. This was begun in January 1910 and given in two courses. The patient has remained in excellent condition with no evidence of a recurrence at the present time nearly nineteen years later.

In this case Dr. Lewis's diagnosis of endothelioma (Ewing tumor) was confirmed by the Bone Sarcoma Registry Committee (see Case No. 398).

Pathologic diagnosis (Prebyter Hospital laboratory)
Small rounded cell periosteal sarcoma

Case VII—Periosteal Osteogenic Sarcoma of the Femur Treated with Toxins and Radium with Only Temporary Improvement. Amputation Performed Followed by Prophylactic Toxin Treatment. Patient Well Nine Years Later.—H. S. male aged nineteen years was referred to me in April 1920. He was given a brief course of toxin treatment followed by radium pack treatment (a total of 20,958 millicurie hours over two areas at 6 cm. distance). The tumor at first showed evidence of diminishing in size but it later began to increase and an amputation was performed in August 1920. Prophylactic toxin treatment was given for six months with occasional intervals of rest. The patient has remained in good health up to the present time nine years later.

In this case the decision of the Bone Sarcoma Registry Committee (see Case No. 172) was that it was osteogenic in

Case VIII—Inoperable Sarcoma Endothelioma Type (Ewing Tumor) of Upper Two-thirds of Shaft of Humerus Treated with Toxin and Radium. Reunion of Pathologic Fracture. Complete Restoration of Function. Patient Well Four and Three-quarter Years Later.—E. M. male aged forty-seven years was referred to me by Dr. William C. Sheehan and Dr. John B. Deaver of Philadelphia in July 1924 for a tumor that had started in a fracture occurring years previously. In the presence of most who examined the patient the condition was beyond helpful joint amputation. However, treatment with radium pack treatment directly into the tumor supplemented by radium pack treat-

seven years since the treatment was begun This is Case No 320 in the Bone Sarcoma Registry



Fig 216—Case XII	Bone	Fig 21—Case XII	Female
Giant-cell	fibrosarcoma	distal tibia	beginning
11 months	(90,000)	11 months	graft
postoperative	metastasis	local	
cellular			

Later Note A small ulcerated area at the site of the dermatitis has recently been treated by skin grafting and the patient is still in good condition April 1939

Case XIII Giant-cell Sarcoma of the Lower End of Tibia Recurrent After Two Operations Recovery Under Prolonged Toxin Treatment Combined with Roentgen Ray Patient in Good Condition with a Useful Limb (Perfect Function) Twenty-four Years Later A female aged seventeen years This



Fig 214—Case VI Giant-cell
sarcoma of femur. Th
e tumor was removed
and the patient well
after seven years.

Fig 215—Case VI Tumor of
tibia. The tumor was
removed and the patient
well after seven years.

Case XII—Benign Giant-cell Sarcoma of the Lower End of
Femur with Extensive Involvement. Pathologic Fracture
Treated with Radiation Alone. Patient Well Seven Years Later.
—A 41-year-old male admitted to the Mayo Hospital in March 1922, chief complaint of a swelling of the
lower end of the femur for nine months. The pathologic fracture
was treated with radiation. A good functional result was obtained. While
there is some dermatitis resulting from the radiation treatment
and considerable atrophy of the soft part due to endarteritis,
the patient is in good health with no evidence of a recurrence.

seven years since the treatment was begun. This is Case No. 320 in the Bone Sarcoma Registry.



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Follow-up. A small ulcerated area at the site of the dermatitis has recently been treated by skin grafting, and the patient is still in good condition. April 1979.

Case XIII Giant cell Sarcoma of the Lower End of Tibia
Recurrent After Two Operations Recovery Under Prolonged
Toxin Treatment Combined with Roentgen Ray Patient in
Good Condition with a Useful Limb (Perfect Function) Twenty
four Years Later K. K. female aged seventeen years This

case was not registered in the Bone Sarcoma Registry for the reason that the original microscopic section of x rays were lost. It showed however the typical structure of a so called benign giant cell sarcoma although the disease had recurred rapidly after two operations. Under a combination of toxin and Roentgen ray treatment the patient made a complete recovery with restoration of normal function.

This case shows that I was one of the earliest surgeons to advocate and practice conservative treatment of tumors of the long bones especially of the giant cell type.

Late Note—This patient is in excellent health at the present time May 1928 twenty two years after treatment.

Case XIV—Sarcoma of the Lower End of the Radius Probably Giant cell Sarcoma with Complete Destruction of the Bony Shell and 3 Inches of Bone (Clinical and Roentgenologic Diagnosis No Biopsy) Treated with Toxins Alone Disappearance of Tumor Regeneration of Bone Restoration of Function Patient Well Eleven Years Later—L. D. G. male aged twenty nine years was referred to me by Dr. Virgil P. G. G. in April 1918. My diagnosis from the clinical and roentgen ray evidence was that of central sarcoma probably benign giant cell type although the tumor was of rather rapid growth and had completely destroyed the bony shell—pointing to the possibility of its being a more malignant type of tumor. The Bone Registry diagnosis is (Case No. 211) that of benign giant cell tumor. Under systematic injections of the mixed toxin of erysipelas and *Bacillus prodigiosus* without adjuvant other treatment the patient made a complete recovery with regeneration of bone and restoration of normal function. He is in good health at the present time eleven years later.

Assuming that this was a case of benign giant cell sarcoma of the radius it is worthy of note that this cell neoplasm was obtained with a very high percentage of disability—entire eradication of treatment was almost impossible—and without the disadvantages associated with a biopsy of the complicated operation of bone grafting which is advocated by Bloodgood and other surgeons.



Fig. 218—Case XIV. C. L. M. fl. l. f. d. th. m.
 pl. t. l. t. f. p. l. p. b. l. y. be. gn. g. t. l. t. m. d. so. d. g.
 se. l. l. th. B. S. I. g. T. t. d. th. l. C. m. p. l. t.
 ce. n. y. l. H. l. l. t.



Fig. 19—Case XIV. S. so. h. f. re. tm. t. l. gu.



Fig. 220—Case XIV. Fracture of the tibia.

Case XV—Inoperable Osteogenic Sarcoma of the Occipital Bone Following Recent Trauma. Treated by X-rays and Radium. Complete Recovery. Patient Well Three and One-half Years Later.—W. B. male aged twenty-eight years was admitted to the Hospital for Reptured and Crippled, October 1925, service of Dr. J. P. Huet. This case is of especial interest as it furnishes a typical example of acute traumatic malignancy. In September 1925 the patient received a severe blow from a wooden packing case which had fallen from a pile nearby striking him on the back of his head. A small hematoma immediately developed. It was treated by local application with slight diminution in size until two weeks later when it began to increase in size. The tumor was incised in the belief that it was a hematoma. The hemorrhage proved so severe that it required very tight packing to control it. Later under ethyl an explosive operation was performed by Dr. Huet who found a malignant tumor which had already destroyed both tables of the skull and had extended to the dura. It was very vascular and again required very tight packing to control the hemorrhage. A microscopic

section was examined by Dr Ewing and pronounced small spindle cell sarcoma probably an osteogenic sarcoma. The patient was then referred to me. For the next eight months he received systemic injections of the mixed toxins supplemented by three radium pack treatments. The wound healed, he made a complete recovery, and recent clinical and roentgenologic examinations fail to reveal any evidence of the disease remaining.

In this case the Bone Sarcoma Registry Committee (see Case No. 837) have rendered a variety of opinions as to the pathology of the tumor. Meningioma has been mentioned by several although in my opinion the microscopic sections and the clinical history alone would contradict this diagnosis. The injury to the head was a comparatively slight one, not of sufficient severity to produce a fracture. The tumor apparently started from the hematoma, it extended from the outside inward and later destroyed the tables of the skull. I believe Dr Ewing's original diagnosis of osteogenic sarcoma was in all probability the correct one.

Later Note—This patient remains in good health at the present time, December, 1918, nearly four years later.

Copy of opinion noted on Registry Case No. 837 by the members of the Committee on Bone Sarcoma of the American College of Surgeons.

November, 1927. The history and the single microscopic diagnosis indicate osteogenic sarcoma. The one very poor section submitted does not justify a histologic diagnosis, and the diagnosis does not seem sufficiently free from doubt to render this a suitable case for statistical purposes. Dr B. C. Crovelli, December 21, 1927. Meningioma (described in the old literature as fungus dura mater) eroding skull. See Cunningham's articles. Dr D. B. Hemmle.

January 6, 1928. No diagnosis. Dr L. A. Codman.

January 6, 1928. Not osteogenic sarcoma. May be meningioma, but no ray formation. Section x-ray and specimen too poor to make diagnosis. Dr C. C. Simmons.



Fig. 222 — Sh. g. t. se. C. se. XVII



Fig. 223 — C. se. XVII f. m. d. t. d. t.

tendency on the part of the pathologic fracture to unite and the leg being quite useless an amputation was performed by Dr Bradley L. Coley. The patient has had very little radiation since the amputation and occasional courses of toxin treatment (intravenous injections). He is in good condition at the present time more than five years since he began treatment and nearly four years since the pulmonary metastases were discovered.



Fig. 24—Case No. 54 in the Bone Sarcoma Registry. (f t t) begun

While it is probably too much to hope for a complete cure in this case the long control of the extensive pulmonary metastases is certainly worthy of note. This is Case No. 54 in the Bone Sarcoma Registry. Diagnosis: osteogenic sarcoma.

Interpretation. A roentgenogram taken in April 1929 showed no extension of the pulmonary metastases but rather slight diminution. The patient is still in good condition and able to perform his work.

He has been given several courses of toxin treatment by his former physician in the last year.

Case XVIII — Myositis Ossificans Closely Simulating Periosteal Osteogenic Sarcoma — J. R. male, aged nine years, fell striking his shoulder on a hard floor in January 1927. A swelling developed almost immediately after and increased in size; this was accompanied by a temperature of 101° or 102° F. Clinically the condition seemed characteristic of osteomyelitis. An ex-



Fig. — Case XVIII. A male child, 9 years old, with a tumor of the shoulder. The tumor is a large, dark, irregular mass on the shoulder, which is the site of the tumor. The tumor is a large, dark, irregular mass on the shoulder, which is the site of the tumor.

ploratory operation was performed by Dr. J. I. Black of White Plains, New York, revealing a tumor in the upper end of the humerus apparently arising from the periosteum. A mass of tumor tissue, firm, consistent, measuring about 2 inches, was removed and examined microscopically. The diagnosis of the local pathology was that of osteoma, which was

confirmed by Dr Lwing and Dr Wood. The condition was apparently inoperable. The patient was referred to me in early February, 1927, when he was admitted to the Hospital for Ruptured and Crippled where the toxin treatment was begun. In a short while the swelling showed evidence of marked diminution in size. At the end of two weeks a hard bone like tumor could be felt posteriorly apparently connected with the upper end of the humerus. No roentgenograms could be taken for two weeks owing to the fact that the war in which the patient



Fig. 26—Case XVIII. Film, Nov. 8, 1927. Oblique view.

lay under quarantine. At the end of this time roentgen ray examination revealed a condition entirely different from the one originally observed. While the film showed a large amount of new bone formation which seemed typical of osteogenic sarcoma of peripheral origin. Stereoscopic series showed quite clearly that this bone was not connected with the humerus but was situated in the muscle tissue about the upper end of the humerus. A history of myositis ossificans was made and no

further treatment was given. Just previous to this one radium pack treatment was applied. The patient is in excellent condition at the present time two years later.

This case is one of the most difficult ones in which to make a differential diagnosis is that has ever come under my observation. I will show you roentgenograms and lantern slides of

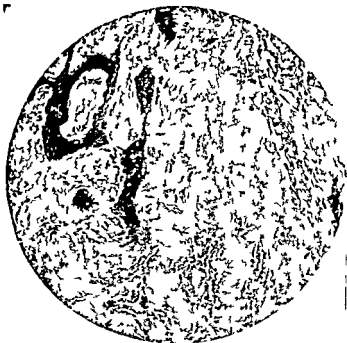


Fig. 22.—Microphotograph of Case XVIII

another very similar case involving the shaft of the femur in which the diagnosis was equally difficult. While the microscopic picture in both cases closely resembled that of an osteogenic sarcoma, the fact that a tumor of considerable size had appeared in less than two weeks after injury would have raised doubts as to the correctness of diagnosis of osteogenic

sarcoma and should have pointed rather clearly to a diagnosis of myositis ossificans

In this second case several roentgenologists had pronounced the condition to be one of periosteal osteogenic sarcoma and a number of distinguished pathologists had confirmed the diagnosis of osteogenic sarcoma. Dr Ewing had made a correct diagnosis of myositis ossificans. No treatment was given and the patient is well at the present time four years later.

Later Note—Case No XVIII remains well at the present time May 1929 two years later

Case XIX—Periosteal Osteogenic Sarcoma of the Upper End of the Tibia Treated with Toxins and Radium with Little Effect Amputation Followed by Prophylactic Toxin Treatment Patient Well Seven and a Half Years Later—J C male age fifteen years was referred to me by Dr Sidney Twinch of Newark N J in October 1921. An exploratory operation was performed and the patient was immediately started on systemic injections of the mixed toxins of erysipelas and *Bacillus prodigiosus* this was supplemented by radium pack treatment (total of 401.2 millicurie hours). The improvement which followed proved only temporary and on December 2 1921 an amputation was performed by Dr Bradley L. Colver immediately after which the toxin treatment was resumed as a prophylactic. The patient has remained in good health up to the present time even year since the amputation.

In this case Dr Ewing diagnosis of periosteal osteogenic sarcoma was confirmed by the Bone Sarcoma Registry Committee (see Case No 16)

Later Note—The patient is well at the present time April 1929 seven years since the amputation was performed

As you may know my reason for advocating the use of the mixed toxins of erysipelas and *Bacillus prodigiosus* in the treatment of inoperable malignant tumors is based upon clinical observation of the complete disappearance of such tumors during a critical attack of erysipelas. In this connection I am fortunate in being able to bring you the following case

Case XX—A female who at the age of two and one half years suffered from an inoperable melanotic sarcoma of the neck. Under an accidental attack of streptococcus—inflammation of neck—the disease eventually disappeared. The patient was referred to me by Dr R. C. Brun of Richmond, Va. Five years later she developed a rapidly growing round cell sarcoma of the gland of the neck (primarily in tumor). I performed a biopsy but did not attempt to remove the tumor. Under prolonged toxin treatment and one application of the radium pack it eventually disappeared. The patient is in excellent health at the present time April 1929 with no evidence of a recurrence thirteen years after the disappearance of the melanoma and eight years after the disappearance of the round cell sarcoma. The diagnosis of both tumors was confirmed by Dr Ewing.

Summary—A brief summary of the cases just presented all of which were treated at the Memorial Hospital of the Hospital for Ruptured and Crippled show the following:

Seven cases of the osteogenic type of which 5 were well from five to twenty years and 2 were well over thirty years.

Five cases of the endothelioma type of which 4 were well from four and the equal thirty years to nineteen years and one was well a little over thirty years.

Six cases of the giant cell and spindle cell type in all of which the limb was saved and the patients have remained well from one to twenty-five years later.

In the 12 cases of primitive telegiectoma including the endothelioma type the limb was saved in 3 cases. Of this group 8 patients have remained well from five to twenty-three years later. In 2 cases metastases had developed.

In addition to my personal experience of the most important and convincing cases of bone sarcoma successfully treated with the method of erysipelas and Bacillus prodigiosus with no other treatment I would call your attention to the recent and remarkable case of Dr Christensen and Palmer reported in the Military Surgeon July 1927, the history of which is as follows:

Captain G. B. male aged thirty-one years had his left leg amputated at the middle third of the thigh on September 21, 1926 for a tumor of the shaft of the tibia which on microscopic examination by Dr. Ewing Taylor was pronounced a very cellular mycosarcoma small polyhedral cell. With this diagnosis Dr. James Ewing and Dr. E. A. Codman concurred. While the patient complained of pain in the stump a roentgenogram taken on November 24th failed to reveal any evidence of a recurrence. On February 23, 1926 four months after the amputation roentgen ray examination showed very extensive recurrence in the stump with marked destruction of bone. On January 25th or one month before the recurrence in the stump was noted a tumor mass the size of a man's fist appeared over the aspect of this stump and on the side of a lemon over another aspect. There were metastatic tumors (2 inches in size) in the inguinal region and another one above the umbilicus.

Treatment with the mixed toxins was begun at once in early January, 1926 the initial dose of 1 minim was gradually increased to 6 $\frac{1}{2}$ minims.

The dosage in this case is extremely important. Up to January 25th the high tide was 6 minims was followed by little reaction except after the first few doses. Yet the mass in the groin had disappeared and the mass at the umbilicus was much smaller. The dose was increased by 1 minim a day from February 21 to 20th when it had reached 18 minims. The treatment was then discontinued on account of the weakness of the patient. A new and extensive growth had appeared in the left arm, tumor and there was much edema of the good leg. On May 1st several small metastatic nodules appeared under the skin of the left arm. During May and June the patient grew steadily with metastatic growth appearing in many parts of the body among which was a considerable involvement of the right iliac multiple tumor of the calvarial bones and cervical vertebrae. The maximum growth that the tumor of the arm had attained was 31 inches. The nodules of the tumor of the arm had broken down with foul discharge.

The treatment resumed on August 19th the initial dose

Case XX—A B female who at the age of two and one half years suffered from an inoperable melanotic sarcoma of the neck. Under an accidental attack of streptococcus— inflammation of neck—the disease entirely disappeared. The patient was referred to me by Dr R. C. Bruan of Richmond, Va. Five years later she developed a rapidly growing round cell sarcoma of the gland of the neck (no pigment in tumor). I performed a biopsy but did not attempt to remove the tumor. Under prolonged toxin treatment and one application of the radium pack it entirely disappeared. The patient is in excellent health at the present time April 1929 with no evidence of a recurrence thirteen years after the disappearance of the melanoma and eight years after the disappearance of the round cell sarcoma. The diagnosis of both tumors was confirmed by Dr Ewin.

Summary—A brief summary of the cases just presented all of which we have treated at the Memorial Hospital or at the Hospital for Ruptured and Crippled shows the following.

Seventeen cases of the osteogenic type of which 5 were well from five to twenty years and 2 were well over three years.

Five cases of the dental type of which 4 were well from four and three quarters to nineteen years and one was well a little over three years.

Six cases of the giant cell osteogenic and spindle cell type in all of which the limb was saved and the patient has remained well from five to twenty four years.

In the 12 cases of peripheral osteosarcoma including the endothelioma type the limb was saved in 3. Of this group 8 patients have remained well from five to twenty three years later. In 2 cases metastases had developed.

I add this to my personal cases one of the most important and convincing cases of bone sarcoma successfully treated with the medietoxin of erysipil and Bacillus prodigiosus alone without the treatment. I would call your attention to the recent and remarkable case of Dr Christian and Palmer reported in the Military Surge July 1927 a brief history of which is as follows.

Captain G. B. male aged thirty one years had his left leg amputated at the middle third of the thigh on September 21 1926 for a tumor of the shaft of the tibia which on microscopic examination by Dr. Ewing Taylor was pronounced a very cellular myeloid sarcoma small polyhedral cells. With this diagnosis Dr. James Ewing and Dr. F. A. Codman concurred. While the patient complained of pain in the stump a roentgenogram taken on November 24th failed to reveal any evidence of a recurrence. On February 23 1926 four months after the amputation roentgen ray examination showed very extensive recurrence in the stump with marked destruction of bone. On January 25th or one month before the recurrence in the stump was noted a tumor mass the size of a man's fist appeared over the upper part of this stump and one the size of a lemon over another part. There were metastatic tumors (2 inches in size) in the inguinal region and another one above the umbilicus.

Treatment with the mixed toxin was begun at once in early January 1926 the initial dose of 1 minim was gradually increased to 6 minims.

The dosage in this case is extremely important. Up to January 25th the highest dose of 6 minims was followed by little reaction except after the first dose. Yet the masses in the groin had disappeared and the mass in the umbilicus was much smaller. The dose was increased by 1 minim daily from February 21 to 20th when it had reached 18 minims. The treatment was then discontinued on account of the weakness of the patient. A new and extensive growth had appeared in the femoral tumor and there was much edema of the good leg. On May 15th several millimetric nodules appeared under the skin of the abdomen. During May and June the patient grew very weak and the metastatic growth appearing in many parts of the body among which was a considerable induration of the right hand multiple tumor of the calf cranial bones and cervical vertebrae. The maximum growth was that the tumor of the thigh had attained a 41 in. diameter. The end of the tumor of the thigh had broken down with foul discharge.

The treatment was resumed on August 19th the initial dose

of 2 minim being increased daily by 1 minim up to 14 minims. By this time marked improvement was evident as shown by a marked decrease in the size of all the tumors the stump had nearly healed.

An interval of rest from September 4th to 19th was followed by a third series of injection which were given daily for three weeks. On November 22d the patient's general condition was excellent he had gained 30 pounds in weight. The stump circumference was 14 inches (formerly 31 inches) the discharge wound had healed the multiple tumors of the abdomen groin scalp clavicle and skin had all disappeared. The patient was discharged from the hospital with no evidence of disease on December 5, 1926. As a precaution a fourth series of treatment was given from February 13 to March 1, 1927, the third day in total dose 3 minims carried up to 30 minims.

Liter Note—Dr. Chittenden and Palmer very kindly brought the patient to the Memorial Hospital for me to see in December 1927 and he was presented to the staff. The case was regarded as so important that it was published in the February 1928 issue of the American Journal of Surgery. In my comment at the time I cited the author's credit for having obtained perhaps the most remarkable success yet recorded in the treatment of bone sarcoma and I congratulated them most fervently. He had the courage and perseverance to institute this second course of treatment after the apparent failure of the first when the condition seemed so utterly hopeless. I followed this patient on March 13, 1929, on the basis of his health with no evidence of a recurrence before the New York Surgical Society. He now weighed 140 pounds his general condition was good there was no evidence of recurrence of the sarcoma the stump of his amputated leg had shrunk to normal size and he had been provided with artificial limbs which he was wearing.

Discussion—In connection with the presentation of case history illustrated the result in removal of the long bones following different methods of treatment will permit only a very brief discussion of the choice of method and I shall merely touch upon the difficult social work with the case.

diagnosis of bone sarcoma which sometimes are real and trouble some. Those who wish to know more about my views upon bone sarcoma are referred to my longer paper on the subject published in the Archives of Surgery and to a more recent publication in the Annals of Surgery.¹

It may be recalled that I was one of the earliest surgeons to advocate the conservative treatment of sarcoma of the long bones having published a paper on the subject in 1904 and another at the Congress of French Surgeons in 1910.² While I continue to be a firm believer in conservative treatment I think that I am now regarded by many of my colleagues as being too radical because further experience with the disease has led me to the conclusion that conservative treatment has certain definite limitations depending upon the histologic and clinical type of the tumor in question. I believe that amputation alone is able to cure but a very small number of cases of periosteal osteogenic sarcoma but early amputation followed by prolonged treatment with the mixed toxins of erysipelas and Bacillus prodigiosus in my experience has resulted in an apparent cure in 50 per cent of the cases of periosteal sarcoma (osteogenic including endothelioma). In proof of this I cite the results in a group of 40 cases treated by this method. 20 have remained well from three to eighteen years.

In regard to radiation I for more than ten years the Memorial Hospital has been the fortunate possessor of a very large amount of radium and in view of the practically hopeless prognosis of periosteal sarcoma under surgical treatment alone a serious effort has been made to determine whether or not better results are obtainable by radiation. During this period nearly all the cases of bone sarcoma including giant cell sarcoma that applied to the Memorial Hospital have been treated by radiation as the primary method of choice. However personal cases and those that have come under my own care at the Hospital for crippled and crippled I have continued to treat in the old way that is the giant-cell group by curettage followed by treatment alone or combined with radium the osteogenic group by radical amputation followed by toxins and in the group of

of 2 minims being increased daily by 1 minim up to 16 minims. By this time marked improvement was evident as shown by a marked decrease in the size of all the tumors; the stump had nearly healed.

An interval of rest from September 4th to 19th was followed by a third series of injections which were given daily for three weeks. On November 22d the patient's general condition was excellent; he had gained 30 pounds in weight. The stump circumference was 11 inches (formerly 31 inches); the distal wound had healed; the multiple tumors of the abdomen, groin, scalp, clavicle and hip had all disappeared. The patient was discharged from the hospital with no evidence of disease on December 5, 1926. A precautionary fourth series of treatment was given from February 13 to March 1, 1927. Every third day initial dose 10 minims, carried up to 40 minims.

Later Note—Dr. Christian and Plummer very kindly brought the patient to the Memorial Hospital for me to see in December, 1927, and he was presented to the staff. The case was regarded as so important that it was published in the February, 1928 issue of the American Journal of Surgery. In my comment at the time I gave the author credit for having obtained perhaps the most remarkable success recorded in the treatment of bone sarcoma, and I congratulated him on his high degree of courage and persistence to institute the condour of treatment after the apparent failure of the first when the condition seemed so utterly hopeless. I showed the patient on March 1, 1929, the best of health with no evidence of recurrence before the New York Surgical Society. He now weighed 140 pounds; his general condition was good; the evidence of recurrence of the sarcoma, the tumor of his amputated leg had shrunk to normal size and he had been provided with an artificial leg which he was wearing.

Discussion—In connection with the presentation of case histories illustrating the end result in carcinoma of the long bones following different methods of treatment, time will permit only a very brief discussion of the choice of method, and I shall merely touch upon the difficulties associated with the art

diagnosis of bone sarcoma which sometimes are real and trouble some. Those who wish to know more about my views upon bone sarcoma are referred to my longer paper on the subject published in the *Archive of Surgery* and to a more recent publication in the *Annal of Surgery*.¹⁸

It may be recalled that I was one of the earliest surgeons to advocate the conservative treatment of sarcoma of the long bones having published a paper on the subject in 1907¹⁹ and another at the Congress of French Surgeons in 1910.²⁰ While I continue to be a firm believer in conservative treatment I think that I am now regarded by many of my colleagues as being too radical because further experience with the disease has led me to the conclusion that conservative treatment has certain definite limitations depending upon the histologic and clinical type of the tumor in question. I believe that amputation alone is able to cure but a very small number of cases of periosteal osteogenic sarcoma but early amputation followed by prolonged treatment with the mixed toxin of erysipelas and *Bacillus prodigiosus* in my experience has resulted in an apparent cure in 50 per cent of the cases of periosteal sarcoma (osteogenic including endothelioma). In proof of this I cite the result in a group of 40 cases treated by this method. 20 have remained well from three to eighteen years.

In regard to radiation I remember than ten years the Memorial Hospital has been the fortunate possessor of a very large amount of radium and in view of the practically hopeless prognosis of perosteal sarcoma under surgical treatment alone a serious effort has been made to determine whether or not better results were obtainable by radiation. During this period nearly all the cases of perosteal sarcoma including giant cell sarcoma that applied to the Memorial Hospital have been treated by radiation as the primary method of choice. However personal cases and those that have come under my own care at the Hospital for Fractured and Crippled I have continued to treat in the old way that is the giant-cell group by curettage followed by extensive and repeated combined with radium the osteogenic group by early amputation followed by toxin and in the group of

rapidly growing round cell sarcoma of the shaft (now generally classified as endothelioma or Ewing's tumor) I have made an attempt to save the limb by a thorough course of systematic injections of the mixed toxin combined with local radiation resulting amputation of the limb as followed to show marked improvement under this treatment. The results obtained by these various methods of treatment have been recorded in the papers already mentioned.

While the Memorial Hospital definitely proved—and I believe was the first hospital to prove—largely through the work of Dr. Heranderson that giant cell sarcoma of the long bone may be cured by radiation alone, especially the untreated have remained well for more than five years. I mention this to note that radiation is the method of choice. My two main reasons for this opinion are (1) Because of the long period of time required to effect cure and the corresponding loss of productivity an important matter with working men and (2) because it is impossible to make a correct diagnosis of giant cell sarcoma of the long bone in more than 15 or 20 per cent of the cases from clinical and Roentgen evidence alone. We have found out of 47 cases at the Memorial Hospital diagnosed clinically and by Roentgen rays as benign giant cell tumor and the patient treated for a long time by diathermy alone that the tumor later proved to be a malignant giant cell sarcoma but by the time this discovery was made the condition had become inoperable and the patient's life had been lost. Therefore I now regard the following treatment of giant cell tumors to be the method of choice: (1) Thorough curettage down to healthy bone (2) wash out the cavity with pure carbolic acid or chlorid (3) pack the cavity with sterile gauze (4) keep the cavity level with Dakin's solution and (5) a few days after operation start giving the four months course of prophylactic treatment. In addition calcium iodine and vitamin preparations might be used to advantage but this should not be done until the cavity has been fully filled by normal granulation tissue and radiation increases the chances of infection.

I believe that the dangers associated with curettage are no longer a serious drawback since the introduction of Dakin's solution has made it possible to keep the wound clean. In my opinion the method just cited makes it possible to save the limb in practically all cases of giant cell sarcoma even those of the lower end of the femur with extensive involvement of the knee joint. I have had 2 such cases one of which has just been presented. In the other in which the disease was even more extensive not only the knee joint but the upper end of the tibia was involved. One treatment with radium was given after curettage and three months' treatment with toxins and after the cavity had filled up this patient was alive and well with perfect function eight years later when she died of hemorrhage from childbirth. The method I believe enables one to study the histology of the tumor and thereby to eliminate the one in four error in diagnosis associated with treatment by radiation alone without biopsy. The method at present advocated by some surgeons and many radiologists. Simple biopsy without a complete curettage should never be done in giant cell tumor because of the danger of hemorrhage and the increased risk of infection.

Coming to periosteal osteogenic sarcoma of the long bones the results obtained in 97 cases treated at the Memorial Hospital by radiational means as a primary method of choice have led me to conclude that this method is associated with very definite risk and is not the method of choice. The number of cases thus treated is still too small to include some cures but a yet not a case in which the disease has been definitely eradicated. Biopsy has been recorded under radiation alone and the patient remained well for three years. In 3 cases the condition became inoperable or the patient developed metastases while not knowing that in spite of the fact that improvement in the local condition was noticed in several cases. In 45 cases high amputation had to be resorted to after failure to control the tumor by prolonged radiation only. The patient survived the five year period. In other words

Since his lecture, one has seen the survival of five years in 10 cases of giant cell tumor of the long bones.

I believe that the dangers associated with curettage are no longer a serious drawback since the introduction of Dakin's solution has made it possible to keep the wound clean. In my opinion the method just cited makes it possible to save the limb in practically all cases of giant cell sarcoma even those of the lower end of the femur with extensive involvement of the knee joint. I have had 2 such cases one of which has just been presented. In the other in which the disease was even more extensive not only the knee joint but the upper end of the tibia was involved. On treatment with radium was given after curettage and three months treatment with toxins and after the cavity had filled up this patient was alive and well with perfect function eight years later when he died of hemorrhage from childbirth. This method I believe enables one to study the histology of the tumor and thereby to eliminate the one in four error in diagnosis associated with treatment by radiation alone without biopsy. The method at present advocated by some surgeons and many radiologists. Simple biopsy without a complete curettage should never be done in giant cell tumors because of the danger of hemorrhage and the increased risk of infection.

Coming to periosteal osteogenic sarcoma of the long bones the results obtained in 92 cases treated at the Memorial Hospital by radiation alone as a primary method of choice have led me to conclude that this method is associated with very definite risk and is not the method of choice. The number of cases thus treated is probably sufficiently large to include some cure but a yet not a case in which the diagnosis has been definitely established by biopsy has recovered under radiation alone and the patient remained well for three years. In 3 cases the condition became so poor that the patient developed metastases while undergoing radiation and this in spite of the fact that in the first instance the local condition was not ideal in several cases. In 45 cases in which amputation had to be resorted to after failure to control the tumor by prolonged radiation only 1 patient survived the five year period. In other words

Since his lecture on the pathogenesis of sarcoma of the long bones
performed a biopsy of the tumor.

primary treatment of an osteogenic sarcoma by radiation alone in my opinion distinctly lessens the chance of a cure by later amputation.

If amputation alone with only alternative one might feel that there were little choice but when it has been found possible as it has been to save the life of the patient 50 per cent of the cases by early amputation (before radiation) followed by toxin treatment then it would seem that he in his case the method of choice.

Some surgeons have administered preliminary radiation in early cases of osteogenic sarcoma and in the event of no improvement this to be followed several months later by amputation. The value of such a practice may be determined only by actual experience but at present we have 3 cases so treated of which only 3 have survived three years. The figure shows how little of any improvement over that of the group treated by early amputation alone and far less than that treated by early amputation followed by toxin treatment.

In the group of so-called endothelioma I believe that the prognosis after amputation alone is as grave as that found in osteogenic sarcoma and that the former even more prone to early metastases. On the other hand all of these cases have been found to be very sensitive to radiation as well as to toxins while the Bone Sarcoma Registry showed some cases of this type treated by radiation alone well followed up for in most instances after marked improvement had taken place (in some cases amounting to the entire disappearance of the tumor) the disease has recurred locally or in the form of metastases and has proved fatal. Some of these cases of endothelioma have been cured by toxins alone and more by toxins and lithium. I believe the method of choice for this group is follow Local treatment by adjuvant of Röntgen rays combined with prolonged systemic treatment with the mixed toxins of erysipelas and Bacillus prodigiosus. The fact that a number of patients with extensive multiple metastases have recovered and remained well for from five to ten years is sufficient witness to the treatment in my opinion justifies a more general use of this method. In addition

tion a number of limbs have been saved by the adoption of this method. In my paper already referred to the results in the endothelioma group are given as follows. Of 26 cases of endothelioma including round cell sarcoma without new bone formation 13 are alive and well from three to fifteen years after. The treatment employed in these 13 cases was operation and toxins in 4 cases, toxins and radium (in 2 cases after amputation) in 6 cases, operation and radium in 1 case, toxins alone in 1 case, radium alone in 1 case (this patient died at the end of three years, cause of death unknown, no local recurrence). Of our entire series of cases treated at the Memorial Hospital and at the Hospital for Puptured and Crippled we have no case of endothelioma of the long bones treated by radiation alone that has remained alive and well for more than three years.

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CLINIC OF DR. IRENE H. ALBEE

NEW YORK POST GRADUATE MEDICAL SCHOOL AND HOSPITAL

APPLICATION OF THE BONE GRAFT PEG IN UNUNITED FRACTURE OF THE NECK OF THE FEMUR

Case I—The patient is a bookkeeper fifty-eight years of age. He had been unable to walk since the time when seven years before he had been attacked and beaten and thrown from a motor car. Fracture of the left hip at that time had been treated by means of a plaster cast in abduction for thirteen weeks with no result.

When I saw him April 21, 1928, he was still unable to walk except with crutches. Weight bearing was painful. While he was lying in bed movement of the left hip in certain directions was painful and the movement at times caused a clicking sound undoubtedly due to laxity of the ununited fragment. Change of position of the left great trochanter was evident on pushing and pulling. That is, when the examiner grasped the knee on the affected side with his right pronated hand (in this case the left) and with the other hand palpated the position of the trochanter in relation to the anterior superior spine (with the finger palpating the point of the greater trochanter and the thumb fixed to the anterior superior spine) alternately traction and thrust pulled the knee and the trochanter to move in relation to the anterior superior spine. To measure the extent of the pushing and pulling, the thigh and knee were extended and the limb allowed to rest on the examining table. The movement of the greater trochanter to each internal malleolus of the lower leg was noted. When the left leg was pulled to the side of the body by an assistant the shortening of the limb was noted. When the assistant grasped the ankle and thrust the limb upward the shortening increased by 1

inch. The push and pull variation (as it may be called) was thus 1 inch.

The x ray (Fig. 278) confirmed the diagnosis of ununited fracture of the neck of the left femur. It revealed also a large amount of erosion of the neck, but the capital fragment was judged to be of sufficient length to accept favorably a tibial



F 228—L d f f h k f h f m h m k d
f h k (Case I)

graft piece. This operation was the foreclosed one, preference to partial arthroplasty. The reconstruction operation which would have been necessary if the capital fragment had been appreciably mobilized.

On April 7 I exposed the joint by an anterior incision straight downward from the anterior superior iliac spine and made a second over the external table of the femur for the purpose of inserting

the bone graft peg. The neck of the femur was inspected through the anterior incision. Eversion of the foot caused the femoral fragments to separate and the ends of both were then thoroughly freshened with osteotome and mallet. The foot was then restored to the anteroposterior axis and sufficient abduction (about 30 degrees) and traction applied by means of the table to bring the fragments into nice apposition.

Attention was next turned to the incision over the trochanter which had been carried down to the fascia covering the vastus externus. The structures were now both split longitudinally so as to expose the lateral surface of the great trochanter. The point of application of the drill lie $\frac{1}{2}$ inch below the bony ridge to which the fascia overlying the vastus externus is attached. Since the direction of the drill must follow the central line of the neck, due consideration must be given to the angulation of the neck to both the axis of the femur and the vertical intertrochanteric plane. In the average adult the neck makes an angle of 130 degree with the femur and 12 degrees with the vertical intertrochanteric plane when the foot is in the anteroposterior plane.

With the motor drill held in the position thus indicated a hole $\frac{1}{2}$ inch in diameter was drilled through from the lateral aspect of the great trochanter to the broken end of the distal fragment. This point was determined by instrumental palpation between the apposed fragments. The reading on the drill indicating the length of penetration was now 5 cm. The drill was now carried into the apical fragment until the reading was 5 cm. having that the apical fragment had been penetrated for a distance of 2.5 cm. (1 inch). The drill was left *in situ* until a graft was taken from the crest of the left tibia.

The tibia was exposed by a generous incision over the middle third and upper part of the lower third. This lower portion is preferred on account of the greater thickness of the cortex. A portion was then chosen where the crest was straight and regular and the muscle and soft tissue dissected away. With my motor saw a longitudinal cut was made on each side of the crest at an interval sufficient to provide a peg $\frac{1}{2}$ inch in diameter after

this method of clearing debris from the path of the cutting instrument

The peg with some periosteum and marrow adhering was inserted into the drill hole in the trochanter (after removal of the drill) and driven home with the bone drift and mallet. With the end of the handle of a wooden mallet against the great trochanter close to the peg graft (at the point *x* in Fig. 279) and by

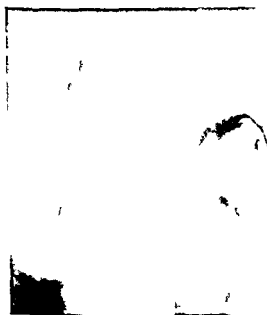


Fig. 279. The bone graft peg in the trochanter. The bone graft is driven home with the bone drift and mallet. The end of the handle of a wooden mallet is placed against the great trochanter close to the peg graft (at the point *x* in Fig. 279) and by

meant the force of the palm against the handle of the mallet. I attempted to secure the approximation of the fragment according to the usual practice. In this case a call will be seen from x-ray taken later (Fig. 30-31). The approximation was not produced for some unknown and unusual reason.

After the wound had been closed and dressed the leg was

his method of clearing debris from the path of the cutting instrument

The peg with some periosteum and marrow adhering was inserted into the drill hole in the trochanter (after removal of the drill) and driven home with the bone drift and mallet. With the end of the handle of a wooden mallet against the great trochanter close to the peg graft (at the point *x* in Fig. 279) and by



Fig. 279. Bone graft peg in ununited fracture of femur. The mallet handle is shown striking the peg from the side. The point *x* is the point of impact.

man (11) of the palm against the head of the mallet. I attempted to secure close approximation of the fragments according to my usual practice. In this case it will be seen from the roentgenograms (Figs. 30-31) that close approximation was not produced from unknown and unusual reason.

After this unit had been closed and dressed the leg was

put up in a double plaster-of-Paris splint extending to the base of the toes on the affected side and to the knee on the sound side.

Eight weeks after operation the cast was cut and the posterior half left in place until the patient had been taken to the x-ray laboratory. Here this was removed temporarily and then reapplied. At my next visit the x-ray film showed that the graft was in good position and holding well. On account of the failure of complete approximation of the fragments it was



Fig. 231.—The same case. The preceding photograph crossed and turned in the position of the foot. The callus has formed beneath the most of the fracture line. From the hospital.

necessary to direct attention with particular care and conservatism. The cast was entirely removed and massage and passive and active movement started. Three weeks later, July 14th, the patient walked a few steps with crutch. He was discharged July 31st on crutches.

The patient was kept under observation at the office and on August 8th another x-ray (Fig. 230) was taken. It showed that

the tibial peg had increased in density but very little callus was evident between the fragments. In view of this condition treatment was still colored by a very conservative attitude lest the graft should break. It was still only three and a half months since the operation and the patient was instructed to continue the use of the crutches and to bear very lightly on the injured leg. He was observed from time to time at the office and continued to show satisfactory movement at hip and knee.

November 17th the x ray taken by Dr. Herrenden showed marked proliferation of the graft peg and a considerable amount of callus between the femoral fragments (Fig. 231). The patient was given permission to bear full weight on the leg but not to give up the crutches. December 3d he was instructed to use a cane. At the present time (February 14th) he is walking without crutch or cane. Motion of the hip is 90 per cent. and of the knee 80 per cent. of normal.

Comment—The bone-graft peg operation has the advantage over reconstruction or partial arthroplasty that it aims at complete restoration of the hip with heal and cartilage intact. From a comparative study of the results of the two methods since my introduction of the bone-graft peg operation in 1912 and of the arthroplastic (reconstruction) operation in 1918 I am convinced that the bone peg operation is followed by an average of better results and is extremely dependable in securing union. In 90 per cent. of the large number of such grafting operations followed up the results were excellent or good.

Locomotion and weight bearing are frequently encouraged before union has occurred in fresh fracture not only because non-union often goes uncorrected but because of a misconception of the nature of non-union which has been encouraged by statements that till union in the literature. Fibrous union is rare in the hip. I have seen only 1 case. In euarthrosis with the practical extension of the joint an ankylosis between the fragments is almost invariably present so that one can easily thrust a blunt instrument between the fragments. This state of affairs should be assumed to be present in all cases of non-union. Far from stimulating the laying down of osseous tissue in the absence of

fibrous union weight bearing and locomotion cause erosion of both fragment and prejudice the chances of success of future grafting operation. Weight bearing should be forbidden until six or even nine months after the fracture has been successfully set or in any event until the x-ray indicates sufficient union.

Fracture of the proximal or central part of the neck of the femur intra-articular and union is even more difficult to induce than in intra-articular fracture elsewhere. Under the best management union often fails although occasionally attained only after a protracted convalescence of a year or more. For these reasons a distinguished European surgeon applies an autogenous bone-graft piece in every case of fresh fracture of the neck. If I am not quite prepared to follow him completely, generally I am at least in sympathy with his point of view. Certainly in case where rapidity of ultimate recovery is especially desirable as when protracted convalescence would entail serious economic hardship I would consult the patient's wishes. In several cases in which the patient is intelligent enough to appraise the issue well I have used the graft method in the treatment of fresh fracture of the hip.

CASE II—This case was similar to the last but occurred in girl aged seventeen years. The left hip had been fractured in an automobile accident. The general condition was so serious (as the result of allged collapse of the right lung) that no attempt was made to set the hip for two weeks. A cast applied at that time was removed after eleven weeks. The x-ray showed no union.

I saw the patient November 8, 1928, fifteen months after the accident. She was not able to walk but the x-ray showed no union to indicate operation. With the left thigh flexed to attempt at push and pull on the thigh elicited marked complaint of pain in the hip. With the leg in the extended position on the examination table pushed and pulled at on weight which severe pain was complained of during the process of movement. The presence of non-union deduced from the observation and the appearance of coxa vara revealed by the x-ray (Fig. 23?) was believed to

constitute sufficient ground for recommending the bone peg operation

The first operation November 15 1928 could not be completed because of the patient's unfavorable reaction. The same general procedure was followed as in Case I but abduction of the thigh prior to the making of the drill hole had to be so managed as not only to bring the fragments into apposition but



Fig. 2. Case II. The fracture is a comminuted fracture of the femur. The fracture is a comminuted fracture of the femur.

to correct the extra var. By the time the drill hole was completed the blood pressure was falling and the pulse rate mounting. My colleague D. S. O. Irwin of the opinion that operation might be safely rejected with. I considered that nothing would be better than sitting at the post and that if a crisis did arise it would be better to hold on until to close. Accordingly the drill was withdrawn the wound quickly closed the leg put up in a light plaster cast and the patient returned to her

fibrous union we hit bearing and locomotion cause erosion of both fragments and prejudice the chances of success of future grafting operation. We hit believing should be forbidden until six or even nine months after the fracture has been successfully set or in any event until the x-ray indicates sufficient union.

Fracture of the proximal or cervical part of the neck of the femur is intra-articular and union is even more difficult to induce than in intra-articular fractures elsewhere. Under the best management union often fails altogether or is attained only after a prolonged convalescence of a year or more. For the reasons a distinguished European surgeon applies an automatic bone

raft pipe in every case of fresh fracture of the neck. If I am not quite prepared to follow him generally, I am at least in sympathy with his point of view. Certainly in cases where rapidity of result is especially desirable as when patient acted convalescence would entail serious economic hardship I would consult the patient's wishes. In several cases in which the patient was intelligent enough to appraise the issues clearly I have used the graft method in the treatment of fresh fracture of the hip.

Cas II.—This case was similar to the last but occurred a girl aged seventeen years. The left hip had been fractured in automobile accident. The normal condition was serious (the result of iliac collapse of the right lung) that no attempt was made to set the hip for two weeks. A cast applied at that time was removed after eleven weeks. The x-ray showed no union.

I saw the patient November 8, 1928, five months after the accident. She was not robust but thin with thin joints and osteoporosis. With the left thigh flexed attempt at passive pull on the thigh elicited marked complaint of pain at the hip. With the leg in the extended position on the examination table push and pull variations were made. The chief complaint was complained of during the necessary maneuvers. The primary diagnosis deduced from the observations and the appearance of coxa vara was confirmed by the x-ray (Fig. 232) which indicated to

constitute sufficient grounds for recommending the bone peg operation

The first operation November 15 1928 could not be completed because of the patient's unfavorable reaction. The same general procedure was followed as in Case I but abduction of the thigh prior to the making of the drill hole had to be so managed as not only to bring the fragment into apposition but



Fig. 232. Lateral view of femur showing the site of the bone peg operation. The dark area indicates the surgical site.

to correct the varus. By the time the drill hole was completed the blood pressure was falling and the pulse rate mounting. My colleague Dr. S. O. Fry was of the opinion that operation might be safely proceeded with. I concluded that nothing would be lost by trying at the point and that if a crisis did arise it would be better than none would to lose. Accordingly the drill was withdrawn and the leg quickly closed. The leg put up in a light plaster cast and the patient returned to her

room where under stimulation the untoward reaction quickly abated.

Before the second operation an x-ray was taken (Fig. 233) which shows the drill hole through the fragments. Anesthesia in its course due to relaxation of the coxal varus from muscle spasm is clearly evident in the figure.

Since it was now evident that the patient's resistance was low, a blood transfusion was given in the interval between operations.



Fig. 33—The same case as Fig. 232, showing the position of the fragments. The primary purpose of the operation was to produce a good result.

tions. I ordered this as a wise precaution and a helpful measure in all cases in which the patient's resistance is so low that it adds to the risk of operation.

November 22d the graft was taken from the tibia and the operation completed according to the method already described. The patient stood the operation well.

The plaster was removed eight weeks later, January 14, 1929.

The x ray at this time (Fig 234) showed the bone graft in excellent position the coxa vara completely corrected and the femoral fragments satisfactorily approximated. Massage and passive and active motion were instituted at once. Two weeks later motion had increased satisfactorily and the patient was walking with crutches and bearing slight weight on the affected leg.



Fig 234—The mass of the graft is in excellent position. The coxa vara is corrected.

On February 14th the patient reported to my office. The x ray (Fig 35) showed no satisfactory increase in the density of the graft and union between the femoral fragments. The patient was trusted to begin full weight bearing.

Comment. These cases were selected to contrast a difficult case with an easy one and to illustrate how the result of the operation influences the management of convalescence. In the

first case the fragments were not approximated ideally and the graft had to stand the strain until the slow process of callus formation eventually united the fragment. It was nearly eight months before the patient could bear full weight safely and at any time in that period he might easily have undone all the progress made.



Fig. 3.—The same case as Fig. 34, held together by the peg and sutured.

In the second case the x-ray showed good result both after operation and today, two weeks after operation, the patient is walking.

One will be complete and solid (1) if the case properly selected (2) if the graft is applied by that technique which can be executed only with automatic power-driven tool and (3) if convalescence directed with the care which these cases are intended to illustrate with the knowledge of the progress of the case which is produced by the x-ray.

This statement is not dogmatic but is dictated by my experience with the bone graft peg operation. In over eight year I have never failed to secure union in any case. Fracture of the graft occurred in only 2 cases and these were both in my early work over fifteen years ago. In 1 case the fracture was due to a fall while the patient was intoxicated.

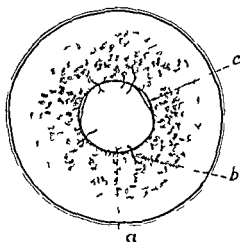


Fig. 236—S. I. t. p. sec. t. f. scul. a. t. f. peg. g. ft.
 B. f. u. f. gl. f. y. f. l. cog. l.
 f. pe. i. p. f. th. i. l. pe. k. l. t. d. f. h. h. l. l. l.
 f. f. h. l. j. po. th. t. b. p. lla. l. l. ood. vessel.
 f. h. cell. t. f. th. h. bo. pe. t. g. h. h.
 f. l. t. ca. i. g. h. H. l. f. l. comp. t. bo. f.
 h. g. ft. l. l. h. blood. sel. from. l. fragm. t.
 l. l. t. h. h. f. g. l. y. h. g. f. k. scul. -co.
 l. f. l. l.

Un n may f il in v uth. lla in the l l rl. I have ha l cases f n n uni n n jati nt. c v younger than the p rl in Case II. In th huj th r ar p e ul ar con lition. h ch mil tate again t uni n reg rles. f the on titut nal con liti n or age f the patient.

1 There i little o n j i teun l ut th heal and neck f th femur.

2 Imm l l l zati i l l l ult.

3 The synovial fluid which tends to flow between the fragments as soon as fracture occurs has an inhibiting effect on callus formation.

4 The neck and head have a meager blood supply on account of the absence of soft parts through the attachments of which in other areas than joints circulation is supplied to the periosteum and bone. In the event of solution of continuity of the neck the capital fragment has no blood supply except that provided through the ligamentum teres. Even the fractured

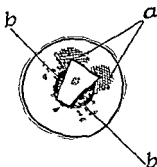


Fig. 237.—Diagram illustrating the blood supply to the femoral head and neck. The diagram shows the femoral head and neck, with the blood supply to the head and neck. The blood supply to the head is through the ligamentum teres, and the blood supply to the neck is through the circumflex femoral artery. The diagram also shows the blood supply to the head and neck through the circumflex femoral artery.

surfaces secure all the blood supply by way of minute blood vessels traversing the bone itself, the bone having no auxiliary supply from the surface.

It was shown by Johnson that the rate of osteogenesis is in direct relation to the flow of blood to the zone of fracture.

The relation of the circulation to repair is not peculiar to healing bone. In wound of soft tissue repair is preceded by hyperemia and the granulation tissue formed about a nodule of capillaries. In healing bone the process is essentially the

same granulation tissue is pushed out from the opposing surfaces until the gap between the bones is closed by osteoblastic cells which eventually lay down lime salts to produce solid bone. It is thus clear that the closer the surfaces of the wound (the opposing surfaces of the fractured fragments) the less granulation tissue will have to be formed and the more rapid the union and the richer the blood supply the more readily obtainable the material for repair and ossification.

The same principles apply to the union of graft and host bone in the bone graft peg operation. Circulation in the graft is effected by the linking up of the blood channel in host and graft and illustrated schematically in Fig. 236. The smaller the gap between them the sooner will the new capillary bridge it. If host and graft are in immediate contact the union of the two circulations is exactly similar to that in the healing of a wound by first intention. If the bones are not in contact the space is filled either with air or blood and debris which must be removed (either by absorption or by the leukocyte) before solid union can occur.

When the peg fits too tightly the surface of both graft and drill hole are subjected to destructive pressure when the graft is driven home. Not only is the bone of repair thus filled with a layer of traumatized bone but the vascular channel is partly or wholly occluded in the very area where increased circulation is demanded by the exigencies of reconstruction and incision. When the peg is cut and shaped by hand tool the fit is regular in some places but jagged points cause irregular injury and destruction of bone and occlusion of blood vessel in others. The space left between the two surfaces is filled with air or blood or debris from the excavated bone. If the practice of inserting a section of fibula is followed exactly a gap exists between the grafted bone and the host bone and a false union and a false union in both host and graft along the entire length of the drill hole as shown in Fig. 237.

In judging the efficacy of all these procedures it must be remembered that the chief result is a continuity of the Haversian canal and the capillaries which they contain from host to graft.

and from one fragment to the other. Hence the necessity for the greatest care in the approximation of bony surfaces (whether of the fragments or of graft and host) so that union may be as rapid and the callus as firm as possible. I do not attempt to attain such accuracy by manual method. Only by precise automatic motor-driven tool can the graft peg be given that glass stopper fit which is demanded by the mechanical and physiologic principles of bone grafting.

CLINIC OF DR. CHARLES MURPHY GRATZ

SECOND DIVISION HOSPITAL FOR RUPTURED AND CRIPPLED

PATHOLOGIC FRACTURE OF HUMERUS

This case presented unusual difficulties in differential diagnosis because of x-ray finding suggestive of a neoplastic process with a strongly positive Wassermann reaction. However union was obtained within seven weeks without operation or hospitalizing the patient and the treatment later resulted in an apparent complete cure of the pathologic process.

The patient E. S., a married woman aged fifty-three years was first seen in consultation with Dr. C. I. Huey of Suffern, N. Y. on January 16, 1928. She gave a history of striking her left elbow against the side of her automobile on January 8, 1928. The blow though trivial resulted in fracture near the juncture of the middle and distal third of the left humerus. When examined the lower half of the arm was markedly swollen and painful. Motion of the elbow was restricted and preternatural mobility was noted at the site of fracture.

Previous History and Physical Examination. Painful limitation of motion of the left arm and forearm was noted four years previously becoming more severe during the last two years. The pain extended from the shoulder down to the fingers. The arm often feeling heavy and being more comfortable if carried in a sling. For many years she had been a freely movable man probably a lipoma on the left side of the thorax the skin over which was not adherent to the muscle. As large as the size of an orange it had not caused any discomfort nor had it increased in size. Careful examination failed to reveal a glandular involvement. Urinalysis and blood-chemistry were essentially negative but the Wassermann test was very strongly positive.

Roentgenograph was taken January 18, 1928 (Fig. 238) and reported by Dr. Herndon as follows: "A pathologic fracture is

noted near the juncture of the middle with the distal third of the left humerus. The density of the humerus varies considerably. Areas of sclerosis are noted along the areas of bone absorption. The process lacks the typical feature of an osteosarcoma or other primary bone tumor. In some respects it simulates a typical film of carcinoma metastasis but the presence of the sclerosis suggests a chronic inflammatory process rather than a



Fig 238 — Lateral view of the left humerus

neoplastic. The X-ray film of the bone negative. X-ray diagnosis: Osteitis fibrosa cystica.

Differential Diagnosis — In making the differential diagnosis, various possibilities were considered.

1. Syphilis of Bone — Clinically this usually involves the shaft and is confined to the medullary canal. Areas of the shaft than noted in this case. The periosteum and cortex show a diffuse proliferation with increased density and thickening in

the chronic cases. In the acute destructive type of syphilis a moth eaten appearance results. Although the case lacked the typical features of syphilis and although cystic formation rarely occurs in such case it seems probable that syphilis was a factor in this pathologic process.

2 *Endotheliomyeloma*—This tumor is most frequently found in persons under twenty years of age and is comparatively rare after the fourth decade. The long history preceding the fracture with absence of metastasis was all against this diagnosis. Pathologically endotheliomyeloma arises in the bone marrow resulting in widening of the medullary canal and thinning out of the cortex with a loss of bone density suggesting calcification. The periosteum is elevated and thickened particularly at the end of the process. In more advanced cases bone may be laid down in onion like layers beyond the cortex. Cyst like areas and trabeculations and giant cell tumors are usually absent. Clinically as well as roentgenologically the diagnosis of endotheliomyeloma seemed improbable.

3 *Carcinoma Metastasis*—This is characterized by gross destruction of bone with little or many evidence of repair or production. Clinically the condition tends to be multiple.

4 *Osteogenic Sarcoma*—The tumor usually arises beneath the periosteum tripping it from a characteristic manner and invading the medullary cavity. x rays show evidence of destruction of bone and early invasion of the soft part. In the bone producing type of this tumor very irregular areas of bone growth are noted in the soft part beyond the cortex. This case lacked the essential features of osteogenic sarcoma.

5 *Osteitis Fibrosa Cystica*—Clinically the long history favored a chronic inflammatory process. The x rays tend to favor the diagnosis.

1 Various cyst like areas

Striation

3 Area of increased density of the cortex with a clear outline of the shaft

4 Absence of active destruction or invasion of the soft part

noted near the juncture of the middle with the distal third of the left humerus. The density of the humerus varies considerably. Areas of sclerosis are noted along the area of bone absorption. The process lacks the typical features of an osteogenic sarcoma or other primary bone tumor. In some respects it simulates a typical film of carcinoma metastasis but the presence of the sclerosis suggests a chronic inflammatory process rather than a



Fig. 238—Shoulder before

neoplastic condition. Radiograph of the bone neoplasm (Fig. 238) shows osteolytic focus.

Differential Diagnosis.—In making the differential diagnosis of various possibilities considered.

1. *Simple Tumor of Bone*.—Clinically, this usually involves the shaft than is noted in this case. The potential of the bone is a diffuse production of the increased density and the lesion in

treatments the cast was cut and the arm cautiously removed from it care being taken to maintain correct alignment during treatment.

Antisyphilitic measures included mixed treatment supplemented by arphenamin and bismuth salicylate.

The cast was removed on February 23, 1928, and a short brace was applied to the left arm. On March 7, 1928, the union was fairly

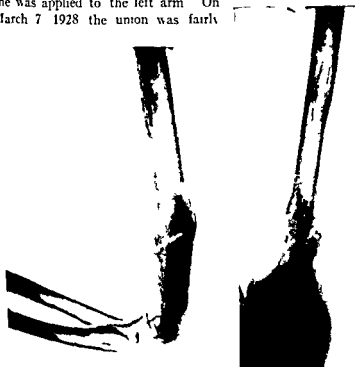


Fig. 3. Pathologic fracture of humerus.

Fig. 4. Same humerus after treatment.

firm and a very light plaster splint was substituted for the cast. The patient was allowed free use of her forearm. From this time on she was encouraged to use the arm as much as possible and the following month she started to play the organ. The progress of the treatment is shown by the radiograph (Fig. 3) (4).

Provisional Diagnosis Osteitis Fibrosa Cystica with Sphulsi

Biopsy at the point of fracture and removal of the lipoma over the thorax for possible primary malignancy were refused by the patient. The treatment consisted of

1. x Ray therapy under the direction of Dr. Herendeen
2. Immobilization of the fracture
3. Anti-splint therapy

x Ray therapy instituted immediately voltage 40,000 consisted of

	2	25	2	
S g p	10	10	10	10
F lt	4 l	4 l m	4 l m	4 l
D	12	16	12	12
M	4	4	4	4
T m	12 m	0 m	12 m	1 m



Fig. 239 — 1

g d
3 19 8Fig. 240 — R y k F b
ru y 23 1928

After the first treatment the shoulder spica was applied and the patient was sent home. For the second and subsequent

treatments the cast was cut and the arm cautiously removed from it care being taken to maintain correct alignment during treatment

Antisyphilitic measures included mixed treatment supplemented by arsphenamin and bismuth salicylate

The cast was removed on February 23 1928 and a shorter one was applied to the left arm On March 7 1928 the union was fairly

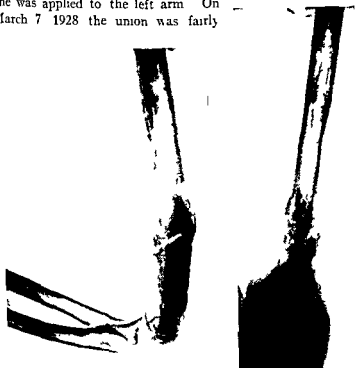


Fig 241—Sh g k d mp m t Fig 24—L l w J
J 12 19 8 1 1928

firm and a very light posterior splint was substituted for the cast The patient was allowed free use of the forearm From this time on she was encouraged to use the arm as much as possible and the following month she started to play the organ The progress of the treatment is shown by the radiographs (Fig 239 244)

She was ambulatory throughout her entire convalescence.

Contributed by Dr. William B. Coley.—Through the courtesy of Dr. Gratz I was permitted to examine the pictures in the case of Mrs. E. S.

From the pictures alone the same type of destructive bony process ending in pathologic fracture might have been due to a



Fig. 243—E. S. Age 30
19



Fig. 244—E. S. Age 30

neoplasm—primary sarcoma, endothelioma type—or to a secondary carcinoma or it might have been due to inflammatory process like myeloid osteomyelitis or to syphilitic osteomyelitis.

With a four-plu. Wassermann in the case I am inclined to believe that this is an example of syphilitic osteomyelitis cured by radical antiluetic treatment.

NONSUPPURATIVE INFECTIOUS OSTEOMYELITIS OF FEMUR SIMULATING OSTEOGENETIC SARCOMA

This patient D. G. a man aged thirty four years was first examined by me at the request of Dr. C. P. Hussey May 20 1928. At that time he gave a history of injuring the distal phalanx index finger left hand about April 1 1928. This resulted in infection which necessitated the removal of a portion of bone from the phalanx. Discharge persisted and four weeks after the original injury he first noted pain in the lower third of the left thigh accompanied by fever and later resulting in pain and flexion deformity of the left knee. There was no history of trauma associated with the latter complaint.

Previous and family history irrelevant.

Physical Examination—Adult mulatto male looked about age stated apparently suffering moderate pain walked with aid of cane. Examination of the index finger of left hand showed marked swelling of the distal phalanx an area of suppuration on the dorsum which on probing showed rotting of the bone. The distal interphalangeal joint was swollen accompanied by marked limitation of motion associated with severe pain.

Examination of the left thigh showed a moderate swelling of the superficial structure. A hard irregular thickening of the lower third left femur was noted on deep palpation especially on the posterior and lateral aspects. There was slight swelling of the left inguinal glands temperature up to 99.4 F.

Two Wassermanns were done which were negative and x ray examination of the involved areas were reported by Dr. Herendeen as follows (Fig. 745)

Anteroposterior and lateral views of the *left index finger* with the right taken for comparison show extensive deformity and loss of substance from the *entire terminal phalanx* with marked deformity and swelling of the surrounding soft tissues and bone. The joint space between the *middle and terminal*

platane is much widened and the joint itself is probably involved

Anteroposterior and lateral views of the *left femur* show a moth eaten zone of destruction in the lower third of the shaft



Fig 245—Ray k May 25 1918

of the femur and covers about 3 inch of its length with no osteal thickening and elevation on all surfaces except the anterior. The periosteal elevation is a much thinner portion of the shaft than the area of destruction. The process largely de-

structure the periosteal thickening being the only productive manifestation. The appearance seems characteristic of a malignant growth of the bone. Osteogenic sarcoma would seem most likely with a Ewing tumor as a second diagnosis.

Stereo-copic films of the *pelvis* give no indication of bone or joint abnormality and no other abnormalities are observed.

Summary—The conditions deserving of most serious consideration in order are probably the following: (1) Primary malignant bone tumor. (2) An acute unusual type of osteomyelitis. (3) A metastatic or carcinoma metastasis to the bone.

We feel that the first condition is the most likely diagnosis and the term osteogenic sarcoma would suffice to classify the lesion. Histologically however it is believed that the condition would be best described by the term plasma cell myeloma, endothelial myeloma or Ewing's tumor.

x Rays of lung and other bones negative.

The patient was seen in consultation with Dr. Fred H. Albee and later with Dr. William B. Coley and was admitted to the Hospital for Ruptured and Crippled May 25, 1928. The distal phalanx of the involved finger was removed May 26th and reported osteitis. Inasmuch as the diagnosis of the condition in the femur was still in doubt a biopsy was done May 29, 1928. A tourniquet was applied to the upper third of the left thigh and the femur exposed by means of a lateral incision over the lower third. The periosteum was found to be very much thickened and congested with definite evidence of bone proliferation. It stripped fairly easily from the cortex. The cortex was found to be moth-eaten with areas of decalcification but no evidence of bone production. A portion was removed using the motor saw in order to avoid all unnecessary trauma. The medullary cavity was increased in size, no sequestra or signs of acute inflammation noted. Macroscopically the tumor simulated sarcoma rather than infection. This opinion was concurred in by Dr. William B. Coley who was present at the operation. Tissues from all three layers of the bone were included in the biopsy. The wound was closed without drainage and a posterior splint applied to prevent any possibility of fracture.

The tissue was sent to Dr F W Jeffries pathologist of the Hospital for Lame and Crippled. His opinion at first favored malignancy. Further slides were prepared and gone over by Dr James Ewing and Dr Jeffries being reported by Dr James Ewing June 7th as follows

Sections show a chronic rarefying and productive osteomyelitis and osteitis. There is no sign of any tumor process.



F 46 L 1 t k J 9 19 28

There are some indications of tuberculosis but nothing specific. The lesion is probably a non-suppurative infectious osteomyelitis.

Dr Jeffries reported July 6 1928 as follows

My ultimate conclusion regarding the bone lesion of M D G regardless of my first impression of malignancy is that

There is no microscopic evidence of sarcoma. I have finally secured satisfactory sections and the lesion can be accounted for as inflammatory in character. I have arrived at this conclusion notwithstanding the clinical and x-ray evidence of sarcoma.

Following the biopsy the patient ran a slight temperature up to 102.6 F maximum which stayed normal after the ninth



Fig 247—Anterior post

J 29 19 8

day. There was a slight discharge from the wound on June 13, 1928, which however cleared up without difficulty. Before complete pathologic reports were obtained, Coley's toxins were given, x-ray therapy was also used three times under Dr. Herendeen's direction. The progress of the case was shown by radiograph (Figs 246-249). When last seen on January 2, 1929, the patient had made excellent progress and was able to return to light work.

Comments by Dr William B Coley—When I was called by Dr Gratz to examine the patient I believed that the x-ray picture of the femur pointed very strongly to an osteogenic sarcoma. The clinical appearance likewise favored this diagnosis. In consequence the tumor was slightly harder than an osteogenic sarcoma and rather favored an osteitis or osteomyelitis. I



Fig 248—Lateral view August 21, 1928



Fig 249—Lateral view January 2, 1929

strongly advised an exploratory operation which was performed by Dr Gratz.

Both Drs Ewing and Jaffin made positive diagnoses of osteitis and not neoplasm. I was not entirely convinced even after the negative pathological report, so that in a number of cases under my own observation which have gone

pathologic report had been made the subsequent clinical history proved the condition to be neoplastic rather than inflammatory. The later clinical history in this case however confirmed the diagnosis of osteitis and I think we can regard this case as a definitely proved case of osteitis of the femur so closely simulating sarcoma from the x ray and clinical evidence that it was impossible to make a diagnosis without a biopsy.

In looking back over the earlier history of this case I find I did not know about or paid little attention to the fact that the man had had an osteomyelitis of a finger a month before and that this was still discharging. The presence of an osteomyelitis on one bone is strong evidence that a pathologic condition developing in another bone a few weeks or months later is inflammatory and not a sarcoma. I have just observed such a case as this at the Hospital for Ruptured and Crippled. A boy of eleven had been treated for osteomyelitis of the hip nearly a year ago. A destructive process recently appeared on the hip radius which from the x ray appearance alone might easily have been mistaken for a sarcoma. As a matter of fact it was regarded as a sarcoma by some members of the staff.

From the previous history together with the fact that there was slight tenderness and low temperature (99.4 F) I made a diagnosis of osteomyelitis which was subsequently confirmed by operation.

These cases though rare are most instructive and illustrate the great difficulties in the early diagnosis of bone tumors.

Comments by Dr William B Coley—When I was called by Dr Gratz to examine the patient I believed that the x-ray picture of the femur pointed very strongly to an osteogenic sarcoma. The clinical appearance likewise favored this diagnosis. In consequence the tumor was slightly harder than an osteogenic sarcoma and rather favored an osteomyelitis. I



Fig 248—Lateral
1918

August 21



Fig 249—Lateral
2 1929

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CLINICAL APPLICATION OF BIMANUAL EXAMINATION OF THE SACRO ILIAC JOINTS

THERE is a wide divergence of opinion of the part played by derangements of the sacro iliac joints in the causation of low back pain. Keith¹ reported a series of 208 cases with low back pain among which were 140 cases associated with posterior thigh and leg pains. He did not consider that the symptoms were due to sacro iliac relaxation or subluxation in any case. In contrast Roers reported 50 cases of sciatic pains 49 of which he considered showed lesions of the lower spine which included articulation and the lumbosacral and sacro iliac joint. In 17 cases the symptoms were attributed to acute strain of the lower back the majority of which in his opinion represented an acute lesion of the sacro iliac joints occurring secondarily to a chronic or recurrent strain of this joint.

Though a complete history and physical examination supplemented by indicated x rays should be the routine in studying these cases the diagnosis will often depend on local examinations of the suspected joint. The various tests heretofore used endeavor to place a strain on the sacro iliac joint and by noting the symptoms produced determine whether a derangement may be present. One of these is to have the patient lie supine on the table with leg and knee acutely flexed the patient grasping the knee with both hands thus fixing the lumbar spine the opposite leg is then hyperextended over the edge of the table. Localized pain or pain referred to the leg is supposed to indicate a sacro iliac lesion. Other tests used are the cross leg test of Smith Peterson and separation of the crest of the ilium in order to elicit pain over the sacro iliac joints. One of the most common tests used in this type of examination is flexion of the thigh with the leg in extension restriction of motion of the thigh and pain referred to the sacro iliac joint may follow in cases where derangements of the sacro-iliacs is suspected. Careful study of

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this group of tests shows that several factors may explain the symptoms produced. For example in the last one mentioned the following possibilities should be considered:

First Stretching of the sciatic nerve *second* direct leverage applied to the sacro-iliac joints with the leg held straight the hamstring muscles running from the ischium to the head of the tibia pull directly on the joint (Rogers) *third* nerve root pressure caused by strain on the sacro-iliac joint *fourth* increased tension of the muscles and fascia of the thigh and lumbosacral region.

The following quotation from Albee's work³ is of interest. The most diagnostic sign of myofascitis is pain at bony insertion elicited by tension on the involved muscle or fascia brought about in examination by limb posture such as forcibly flexing the hip while the knee is extended. For instance myofascitis in the lumbosacral region results in pain in the region of the sacro-iliac joint because of tension upon fascial and muscular insertion over it directly found it.

Inasmuch as this type of local examination necessarily involve nerve, muscle and fascia in addition to the joint it may fail to give an accurate evaluation of any derangement of the sacro-iliac and thus account for the variation in the findings of clinicians. It is believed that this technic permitting direct examination of this joint without the involvement of other structures would add to the accuracy of our deductions.

The position of the sacro-iliac joint makes it necessary to use a slightly different technique applying even the simplest clinical tests that have proved of value elsewhere. In the average patient the convex and the lower portion of the sacrum within the reach of an examining finger approach the peripartus way of the rectum. Inasmuch as the bones comprising the sacrum are firmly fused together and move as a unit pressure applied to one portion of this bone would tend to cause movement throughout the joint on either side. The extent of the anterior surface of the sacro-iliac joint which can be palpated by the examiner will vary considerably to the length of the examiner's finger the position of the patient and the degree of

muscular relaxation of the patient. It has been found that the standing posture with the arms resting on a suitable support and the spine flexed to 90 degrees is the most suitable position for examination in most cases. If for any reason this is not feasible satisfactory examination can be made with the patient lying on the examining table on either the right or left side with the thighs flexed to 90 degrees.

In certain cases an anesthetic is necessary to secure proper relaxation. With the index finger of the right hand in the rectum the palm of the left hand is placed over the posterior margins of the sacrum thus permitting bimanual examination of the joint on either side and aiding localization of any inflammatory mass or irregular swelling in this region. Comparison of the two sides gives an accurate idea of any abnormality that might exist.

If pressure is made by the examining finger internally to the anterior margin of the sacro iliac joints on either side any subluxation or instability of the joint will allow the sacrum to be displaced posteriorly and the movement between the sacrum and ilium will be felt by the palm of the left hand. The reverse of this procedure may also be used pressure being applied by the palm of the left hand and any movement between the two bones noted by the examining finger. If any such movement is felt it may be regarded as direct evidence of subluxation of the joint.

The following case briefly illustrates the clinical application of this test.

Case I—This patient H. W. W. aged sixty five years was first seen in consultation with Dr. H. S. Ducret July 22 1928. He complained of pain over the lower back and right thigh with limitation of motion of the entire lumbar spine and right hip. His symptoms had become acute during the last four weeks.

Precious History—At four years of age his right knee had been injured following which two operations were performed on the knee and many casts applied. These had resulted in 1 1/2 inches shortening of the right leg and partial ankylosis of the right knee. The right hip was restricted in motion the thigh

being held in flexion and adduction. x Ray examination showed a marked degenerative arthritis of the lumbar spine and of both hip. The right knee also showed arthritic changes suggestive of tuberculosis. External palpation of both sacro iliacs was negative. Bimanual examination however showed marked subluxation of the right. This was easily demonstrated by the technic as outlined and was confirmed by Dr Ducret at the time of examination.

In this case the arthritic process made it extremely hard to evaluate results from other tests for sacro iliac subluxation. Although the pathology demonstrated by x rays was sufficient to account for this patient's condition the fact that he had in addition a subluxation of the right sacro iliac would have been overlooked if bimanual examination had not been done.

Case II—Traumatic subluxation of the left sacro iliac. Mr. A. G. aged twenty five years was thrown from his horse injuring his lower portion of sacrum. Sharp pain of the lower portion of the back resulting to the left thigh immediately followed and persisted until the time of examination the following day March 26 1928. At this time there was severe pain on pressure over the entire sacrum particularly over the left sacro iliac posteriorly. There was normal motion of both hips and no pain over either sacro iliac region on flexion of the thigh with the leg extended. Bimanual examination of the sacro iliacs showed slight subluxation of the left and extreme pain on palpation of the anterior margin of the joint. x Ray examination was negative. The patient who was only 5 feet 9 inches in height weighed 203 pounds. Ret with firm immobilization of the sacro iliac joint gave immediate relief. He was able to resume his work in five days and bimanual examination two months later failed to reveal any subluxation of pain.

The early diagnosis and complete relief was gratifying in view of the patient's overweight and the severity of the fall.

The next case is reported in considerable detail to show the systematic examination and treatment necessary to secure result in certain cases. This patient had sought much advice

and a great variety of treatments had been tried without relief. Some of these included physiotherapy, neurologic treatment for the possibility of tumor of the cord, genito-urinary treatment and also treatment for the nose and throat. After a careful study of the case and treatment for subluxation and arthritis of the sacro iliac joint, a very definite improvement was obtained in ten days.

Case III—Subluxation of the right sacro iliac with arthritis. The patient M. S. aged forty-one years, when first seen May 18, 1928, complained of low pelvic pain radiating down both legs, particularly the right, duration six months. Patient walked with the aid of a cane, apparently suffering severe pain and moderate right lumbar left dorsal scoliosis was noted. Physical examination showed weight 141 pounds, height 5 feet 3 inches. Transillumination of teeth showed two of suspected abscess. Both antra were cloudy on transillumination. Scars of previous operations were noted on the abdomen. The patient also had a right indirect inguinal hernia. Local examination showed no limitation of motion in the lumbar spine, movements of both hips normal. Examination of the sacro iliac joints by the routine previously outlined showed palpable subluxation on the right with pain on pressure over the anterior surface of the joint and slight thickening as compared to the left. Laboratory work included chemical blood and urinalysis which showed non-protein nitrogen 50, uric acid 4.4, otherwise negative. A Ray examination showed moderate arthritic changes and separation of the left sacro iliac joint was reported.

Diagnosis—Subluxation of the right sacro iliac joint with moderate arthritis.

The treatment consisted of first Mechanical treatment of subluxation of the right sacro iliac, second attention to foci of infection, diet, vaccines as previously outlined in the treatment of arthritis.

After the first bimanual examination the patient noted a marked improvement in his condition even before the sacro iliac support was applied. By May 28, 1928, he could walk

being held in flexion and adduction. X-ray examination showed a marked degenerative arthritis of the lumbar spine and of both hip. The right knee also showed arthritic changes suggestive of tuberculosis. External palpation of both sacroiliacs was negative. Bimanual examination, however, showed marked subluxation of the right. This was easily demonstrated by the technique outlined and was confirmed by Dr. Ducret at the time of examination.

In this case the arthritic process made it extremely hard to evaluate results from other tests for sacroiliac subluxation. Although the pathology demonstrated by x-rays was sufficient to account for this patient's condition, the fact that he had in addition a subluxation of the right sacroiliac would have been overlooked if bimanual examination had not been done.

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The early diagnosis and prompt relief was gratifying news of the patient's recovery and the result of this fall.

The next case reported in connection with this fall is a systematic examination and treatment necessary to secure results in certain cases. This patient had sought much advice

CLINIC OF DR. CHARLES E. FARR

NEW YORK HOSPITAL

REMOVAL OF CALCULI FROM THE COMMON DUCT

THE removal of biliary calculi is usually a very simple matter especially if the calculi are confined to the gall bladder or to the readily accessible portions of the common or cystic ducts. However in a considerable number of instances for one reason or another the calculi are almost inaccessible. This is particularly true of the stones buried in the papilla of Vater and in the hepatic ducts but is also true even of stones in the gall bladder and cystic ducts when very dense adhesions have formed and the patient is in no condition to stand a lengthy and severe operation.

A method which I have used a number of times with much satisfaction and which probably has been used by other men but which I have never seen in the literature is the removal of these calculi by a home made suction apparatus. This consists of the butt end of an ordinary rubber catheter which has the usual bell extremity for adaptation to glass connecting tubes. About 6 or 8 inches of the catheter are used. The cut extremity is coupled to an ordinary suction apparatus and the bell end is inserted into the cavity to be explored. I always use as large a catheter as will conveniently pass into the desired situation—usually a No. 20 or 24 French.

The technique is simple. Clamp the catheter so that no suction is exerted and pass the bell end of the catheter by a slit suitable to the location and the size of the stones to be removed. Their location and number should be roughly determined before inserting the catheter. The latter should be brought into the closest possible contact with the stone. When the clamp is

without the use of a cane and his scoliosis had improved. When he was seen August 22, 1928 his improvement of the right sacroiliac joint but no subluxation could be demonstrated. When last seen October 6th bimanual examination was negative except for a very slight thickening of the right sacroiliac joint as compared with the left and his general condition was excellent.

Note—While this method of examination is intended purely as a diagnostic measure marked relief seemed to follow it in this case. It may be possible that the pressure applied posteriorly on the sacrum corrected the subluxation and so accounted for the instant relief which this patient obtained while the support prevented a recurrence.

COMMENT

It is interesting to observe that although many clinicians have noted that subluxation of the sacroiliac joint results in pain distributed over the course of the sciatic nerve in the case reported herewith and in others examined by the author in which examination has shown a definite palpable movement of the joint such movement has never resulted in this type of referred pain.

In certain cases an anesthetic will be necessary in order to make a satisfactory examination and if operative measures for mobilization of the sacroiliacs are contemplated preoperative bimanual examination should always be done.

It is the writer's belief that this method of examination is in accord with the established clinical investigation of other joints and has in the author's experience clarified the diagnosis in many instances. Positive findings enable us to outline suitable treatment immediately and negative findings show us that we must look elsewhere for the cause of the patient's complaint.

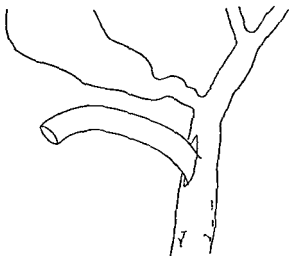
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a simple matter however to replace the catheter with another one or if necessary to remove the stones by means of crushing and washin^g or by the use of a probe

This technic has been found very useful in removin^g mucus and other aspirated material from the trachea after an emer^gency tracheotomy. Many other situations will naturally arise in which this method can be used.

released and the suction is suddenly and powerfully applied the stone is firmly grasped by the soft thin rubber at the bell end and will be held firmly while being extracted. The process can be repeated any number of times until the cavity or duct is completely emptied. In this way stones which are otherwise almost inaccessible can be fairly rapidly removed. Tightly impacted calculi or those with very rough uneven surfaces which do not fit into the bell end of the catheter will offer some difficulties but they can be easily overcome by persistence.



F O—C h h comm d t

The advantages of this method are its simplicity and its ready applicability to almost any situation. It appears to have no disadvantages except a slight clumsiness with the insertion of the bell end into a small incision and the damage to the mucous membrane by a suddenly applied suction. This should not occur if reasonable skill is used in locating the stones and setting the bell end before the suction power is applied. One annoyance which I have experienced is that if there are many small stones they will be drawn well into the catheter and will block it. It is

a simple matter however to replace the catheter with another one or if necessary to remove the stones by means of crushing and washin or by the use of a probe

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CLINIC OF DR. GUILFORD S. DUDLEY

SECOND SURGICAL DIVISION, BELLEVUE HOSPITAL

TWO CASES OF CARCINOMA OF THE PANCREAS

Case I—G. P., a man fifty-eight years of age, was in perfectly normal health until six months before his admission into the Second Surgical Division of Bellevue Hospital. About this time he began to suffer from indigestion as evidenced by gaseous eructations and general epigastric discomfort occurring irregularly and with no relation to meals.

After about three weeks of these symptoms he noticed the gradual onset of jaundice, the intensity of which increased progressively until the present time. Accompanying the jaundice he had pruritus and had noticed clay-colored stool.

Examination showed him to be deeply jaundiced, lightly emaciated and apparently chronically ill. There were no other positive physical findings. At operation his gall bladder was found distended with bile but contained no calculi. His entire pancreas was identified as a firm nodular tumor mass which gave the clinical impression of being undoubtedly carcinomatous. The operative procedure consisted in an anastomosis between the fundus of the gall bladder and the pyloric antrum of the stomach.

He did not stand this procedure well and died with the symptoms of pulmonary edema about twenty-four hours after operation.

At autopsy his entire pancreas was found markedly enlarged, unusually firm and nodular. On section in the gross it appeared to be practically completely replaced by a diffuse new growth. Its ducts were markedly dilated and tortuous in outline and partially filled with mucinous appearing material. A careful search

of the lymphatic glands throughout the body and of the remaining abdominal thoracic viscera showed no evidence whatever of any metastatic tumor. Histologic examination of the pancreatic neoplasm proved it to be an adenocarcinoma.

Case II—This patient forty years of age was admitted to the hospital in July 1927 with the history that his first symptoms occurred three months prior to admission. A dull pain in his right upper quadrant belching of gas and the appearance of jaundice were his chief symptoms. Because of the persistence of the increase in the intensity of his jaundice and the loss of 10 pound weight the patient entered the hospital.

At operation the head of his pancreas was found to be involved by a firm nodular apparently carcinomatous mass about the size of an orange. No evidence of metastasis was found in the liver or elsewhere in the abdomen and for the purpose of draining his biliary system an anastomosis was made between the fundus of the gall bladder and the pyloric antrum of the stomach.

His convalescence following the operation was satisfactory and he remained in reasonable satisfactory condition until October 1927. At about this time he began to suffer from a recurrence of his upper abdominal pain which now however was accompanied by vomiting. His jaundice which had subsided after the operative procedure had not recurred. He was readmitted to the hospital and was kept under observation for five days during which time a fluoroscopic examination of his stomach showed that a bulbous dilatation of his jejunum. He was operated upon under the diagnosis of duodenal obstruction and a posterior short loop gastrostomy was done under local anesthesia.

Following the procedure he progressed fairly well for about three weeks but then began to suffer from severe right upper abdominal pain. His temperature became elevated and after repeated examinations of the right upper abdomen the conclusion was reached that he had developed a localized abscess of suppuration in the retrohepatic region. With

this in mind his right upper abdomen was opened and explored but no abscess was found. This operative procedure brought about no relief of the patient's symptom. He continued to lose weight rapidly and died twenty four days later.

At autopsy it was found that there was carcinomatous involvement of the head of the pancreas which by its progressive growth had encroached upon the lumen of the duodenum to the point of obstruction. This tumor was infected and was undoubtedly the cause of the persistent fever. There was no evidence whatever of metastatic involvement either of the liver or of the adjacent lymphatic glands.

Comment—These two instances of pancreatic carcinoma tend to illustrate the lack of metastatic involvement usually associated with such neoplasms. The first case is unusually interesting because of the fact that the patient's sugar tolerance test showed a prolonged elevation as in diabetes but his blood sugar was normal on two occasions and his urine showed the presence of sugar on some day and not on others. With a tumor involving the entire pancreas like this one would reasonably expect more disturbance in sugar metabolism than was shown by this patient.

CARCINOMA OF THE TRANSVERSE COLON

C C aged sixty-one years In February 1923 the patient began to suffer from intermittent cramp like upper abdominal pain which was not associated with meals but did occasionally awaken him at nights He had noticed no increase in constipation and there had never been any blood in his stool He thinks he had lost some weight but did not know how much

He was admitted to the hospital after the report of a gastrointestinal series of x rays showed a distinct defect in the mid portion of his transverse colon He was operated on February 21 1923 the day after his admission into the hospital under the preoperative diagnosis of carcinoma of this portion of the gut

At operation a carcinomatous mass about 2 inches in diameter was found involving the midpoint of his transverse colon Exploration of his abdominal cavity showed no evidence of metastasis and the involved segment of the transverse colon was excised The two open ends of the colon were inverted and a 2 inch lateral anastomosis was made between these closed loops

His postoperative convalescence was completely satisfactory there being but very mild infection of the subcutaneous fatty tissue at either angle of his wound No fecal fistula formed at any time

The histologic diagnosis was adenocarcinoma of the large intestine with inflammatory hyperplasia of the adjacent lymph node

Although more than six years have elapsed since the above operative procedure the patient has gained weight even beyond his former normal range and has been completely symptom free During the past year he suffered a slight hemiplegia from which he recovered spontaneously He works many hours daily at his occupation of cobbler and illustrates the comparatively favorable prognosis of carcinomata of the large intestine when removed at an early date

ESOPHAGEAL CORROSION

S C a young woman twenty three years of age with suicidal intent swallowed a teaspoonful of lye dissolved in a cup of coffee one week before her admission to the hospital.

She was admitted because of difficulty in swallowing. It was marked that at times she was unable to swallow water. However the passage of a small catheter for diagnostic purposes into her stomach was an easy procedure. She showed progressive improvement during her two weeks stay in the hospital and was allowed to go home.

Nine days later however her dysphagia had recurred to such a marked extent that she was readmitted to the hospital. At this time she presented extreme tenderness and slight edema at the base of the neck on both sides and one observer detected subcutaneous crepitus. These findings indicated an extension of infection through the esophagus into the mediastinum and were considered an indication for the performance of a gastrostomy.

Because of the coincident existence of a pregnancy it was decided to perform a therapeutic abortion at the same time as the gastrostomy. These two procedures were carried out under spinal anesthesia despite the fact that her temperature was elevated to 102° F because of her intrathoracic infection. Although the procedures were satisfactory, in both instances the patient continued to fail because of the progression of her mediastinitis and died nine days following operation.

At autopsy the middle and lower third of the esophagus showed multiple pinpoint perforation through which the fluid gastric contents could be expressed by pressure on the stomach. The mediastinum posteriorly showed a necrotic inflammatory process extending throughout the course of the thoracic esophagus. Although the tissue of the involved esophageal wall was almost completely necrotic there was no area of stricture or diminution of diameter of its lumen. This report of the esoph-

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gical corrosion is interesting because of the relatively long period of time elapsing without the occurrence of any actual cicatricial constriction and illustrates the inadvisability of any attempt at dilatation before all evidences of acute inflammatory reaction have completely subsided.

The intensity of this patient's dysphagia varied from day to day and was probably dependent upon the inflammatory edema and muscular spasm associated with the inflamed esophagus.

The relative infrequency of such tragic results in the individual physician's comparative lack of experience; their proper handling. In this particular instance the question arises as to whether it would not have been wiser at the time of her first admission to have performed our gastrostomy rather than to have allowed her to leave the hospital because her ability to swallow was impaired. Had such a course of treatment been followed the inflammatory reaction might have been influenced favorably and the perforation and mediastinitis might not have occurred.

This thought leads naturally to the suggestion that all cases of esophageal corrosion should be treated by immediate gastrostomy for the purpose of putting the esophagus completely at rest. As stated by Tolks, 25 per cent of esophageal corrosions result fatally and 15 per cent of those who survive the immediate inflammatory reaction develop stricture. Therefore it would seem that immediate gastrostomy would be the best policy for all esophageal burns. To such a course of treatment should be added complete fastening of the passage of any sound bougie as well as abstention from a fluoroscopic or x-ray examination.

Should strictures subsequently develop they may then be handled as and when they arise. Should stricture not develop closure of the gastrostomy is a relatively simple procedure.

DUODENAL DILATATION

J L a white male thirty three years of age has undergone five laparotomies in the past three year The first operation was done for apparently acute appendicitis and he states that the appendix was removed He gained no relief from symptoms however and was operated upon the second time under a roentgenologic diagnosis of peptic ulcer He states that no ulcer was found that no gastroenterotomy was performed but that the gall bladder was removed

Two months following the second operation his gastric symptoms recurred and he was treated for one month by the Sippy diet a treatment that gave temporary relief

At the time of his admission to the Second Surgical Division of Bellevue Hospital on December 29 1927 he gave an acute history of sharp cramp like pain in the upper abdomen accompanied by vomiting and he stated that his vomitus contained blood The details of his gastric history were not characteristic of either gastric or duodenal ulcer but were definite enough to warrant roentgenologic examination His physical examination showed no abnormality other than marked tenderness to pressure the tenderness not being localized to any one point but diffuse over the entire epigastrium

A chemical examination of the vomitus after admission to the hospital was positive for blood His x-ray showed no evidence of gastric or duodenal ulcer but did show a marked dilatation of the second and third portions of the duodenum and reversed peristalsis in the duodenum

At operation January 16 1928 the upper abdomen was found involved by many dense inflammatory adhesions and the stomach and entire duodenum were found to be considerably dilated The pylorus was amply patent and there was no demonstrable gastric pyloric or duodenal ulcer The jejunum was of normal diameter The gall bladder was missing and the liver appeared

normal. During the dissection of the man adhesion, none of these was encountered which could have been considered a factor causing the dilated intestine nor could any contracted contraction or other abnormality be identified or recognized to account for such dilatation. The remnant of the Ligated of Treitz seemed totally free of any contraction or anastomosis.

Reasoning chiefly on the basis of the reverse peristalsis in the duodenum it was decided to perform an anastomosis between the duodenum and the jejunum rather than between the stomach and the jejunum. This procedure was carried out without difficulty without the use of intestinal clamps and the resulting duodenojejunojejunostomy stoma admitted the tip of one finger. The afferent and efferent loops of jejunum did not show any contraction at any point and no further procedure was done.

The patient convalesced from this operation was uneventful and his check up x-ray report before leaving the hospital showed that the dilatation of the duodenum and the reverse peristalsis previously noted were no longer present. The roentgenologist went so far as to state that this appeared to be an excellent functional result.

The patient was not seen during the ensuing ten months but on December 5, 1938 was readmitted to the hospital. He stated that he had felt well for about six months when he had again suffered a recurrence of his gastric symptoms and had submitted to a fourth laparotomy in Texas. He states that nothing except a division of a lymph node was done at this operation.

He was readmitted to the Second Surgical Division of Bellevue because of a further recurrence of his gastric symptoms and vomiting. His x-ray now showed his duodenojejunojejunostomy stoma to be functional but although it appeared to have contracted considerably. His stomach and duodenum again showed that they were both dilated and that there was a marked retention of more than two-thirds of the opaque meal. No evidence of gastric duodenal or other intestinal ulceration was present.

A preoperative consideration of the proposed procedure to be carried out resulted in the general decision that an effort should

be made to disconnect his duodenojejuno tomy to occlude his pylorus and to drain his stomach through a gastro enterostomy. It was felt that with the persistence of his patent pylorus simple gastro entero tomy would not necessarily overcome the duodenal dilatation.

At operation on December 15 1928 the extent and density of his intraperitoneal adhesion was so marked however that

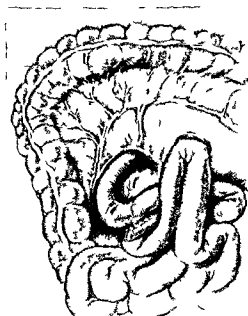


Fig 51—D d j j t m p t l p l p g t j j t y d
t t my

the desired procedure was not practicable. The vascularity of these inflammatory adhesion between the viscera and the parietal peritoneum was such as would have been the ideal result of a Talma operation. The duodenojejunoostomy stoma was identified and palpated but it position was so inaccessible that an effort to disconnect it was not made. The liver was not seen nor was palpation of the stomach or first portion of the duodenum

practicable. The operation was concluded by the performance of a posterior gastro-enterotomy to the efferent loop of jejunum leading from the duodenojejuno-otomy (Fig. 251). Because of this long loop gastro-enterotomy an entero-enterotomy was made distal to the gastro-enterostomy. Both of these anastomoses were performed with the use of intestinal clamp for the purpose of saving time.

During the closure of the patient's abdominal wall and while he was still under anesthesia he suffered a generalized convulsion although no history of epilepsy had ever been obtained from him.

His convalescence was remarkably smooth and his own statement was that he felt much better after this operation than he did following the duodenojejuno-otomy of a year previous. His check-up x-ray before leaving the hospital shows however a six-hour gastric residue of one third of the opaque meal. The gastro-enterostomy stoma functioned rather sluggishly and the meal after leaving through this opening appears to divide in about equal portions to the right and left.

Comment.—The findings in this case are interesting from a point of comparison with the report of 2 somewhat similar cases by Judd and White. In the present case however the cause was not recognized by organic or anatomical explanation for the dilatation of the duodenum. The unexpected occurrence of the generalized convulsion under anesthesia and the further detailed history that the man is a dipsomaniac and that his mental life is not settled suggests that the case is probably an undetermined constitutional idiopathic factor present. At the present time especially in view of his late x-ray findings it seems questionable whether he will derive any benefit from the total or his various operative procedure.

Judd and White. *Am. J. Surg.* vol. lxxx. July, 1929. 11 pp.

BILIARY LITHIASIS

J G a white male thirty seven years old was operated upon seven years ago at another hospital for gall bladder disease. Repeated communications with that hospital were unsuccessful in determining whether or not his gall bladder contained calculi at that time.

He was well until three weeks prior to admission to the Second Surgical Division of Bellevue Hospital on June 15 1928. At this time he began to suffer from a recurrence of biliary symptoms. The positive findings of his physical examination were localized tenderness to pressure over his gall bladder region and moderate muscular spasm in the right upper abdomen.

During his three day preoperative observation it was concluded that there did exist a very slight jaundice. At operation his gall bladder was found firmly embedded in a mass of inflammatory adhesions but its walls were not thickened and it contained no calculi nor were there any calculi in the cystic duct. Its size was approximately three times that of the normal gall bladder and it contained normal appearing bile. The biliary ducts were palpated and were found not to be dilated. No calculi were palpated within the ducts. His liver appeared normal. His gall bladder was removed and the wound drained. For several days bile drainage was profuse from his wound but other than this his convalescence was entirely satisfactory and he left the hospital twenty three days after operation.

He remained well for about one month but at the end of this time again suffered from upper abdominal symptoms and rapidly lost 25 pounds in weight. He did not become jaundiced nor did he give any history of chill fever or sweats. He was readmitted to the hospital and kept under observation for three weeks. During this time he showed no jaundice and no reasonable preoperative diagnosis could be made despite the suspicion of subdiaphragmatic abscess or gastric or duodenal ulcer.

At operation the common bile-duct and the right hepatic bile-duct were found to contain an enormous accumulation of calculi. The common duct was opened and many, though not all of these calculi were removed. Because of the patient's condition the operative procedure was terminated by the insertion of a fenestrated catheter into the hepatic duct for drainage and for the subsequent administration of bile to the patient.

His postoperative convalescence has been exceedingly eventful. An incredible number of calculi, great numbers of which have appeared as accurate casts of the smaller biliary ducts, have been discharged through the wound. As long as his gall bladder remained as a functioning organ no calculi formed within his biliary ducts. As soon as it was removed some change took place which resulted in the formation of multiple calculi within the ducts. The explanation of such a rather unusual sequence of events must of necessity be speculative. It would seem that cholecystectomy had perhaps so altered pressure relations within the system as to bring about sufficient stasis of bile to permit the formation of calculi in an individual so predisposed. Perhaps some secretory activity of the gall bladder mucosa prevented calculus formation within the ducts prior to the cholecystectomy. Whatever the explanation, the ultimate outcome probably depends upon an alteration in the patient's metabolism whereby further calculi will not be formed.

CLINIC OF DR. FRANK C. YEOMANS

DEPARTMENT OF PROCTOLOGY, NEW YORK POLYCLINIC MEDICAL
SCHOOL AND HOSPITAL

SIGMOIDOSCOPY *vs* x RAYS IN THE DIAGNOSIS OF TERMINAL BOWEL PATHOLOGY

ROENTGEN rays and the sigmoidoscope are comparatively modern aids in the diagnosis of intestinal conditions. Roentgen discovered the x ray and Howard Kelly introduced standard rectal endoscopes in the same year (1895).

The x ray has a vastly wider range of application than the sigmoidoscope but in its more restricted field the sigmoidoscope yields knowledge far more accurate than the x ray. By the x ray the entire gastrointestinal tract may be visualized but correct interpretation of the shadows may present the greatest difficulties. Because of their situation within the bony pelvis the pelvic colon and rectum are the most difficult portions of the large bowel for a satisfactory roentgenologic study and even gross lesions may be missed.

The modern sigmoidoscope consists essentially of a tube 12 inches in length and of 1/2 inch diameter with obturator closed at its proximal end by a window to which an inflating bulb is attached and illuminated by a small electric bulb. The tube when introduced reveals the interior of the entire rectum and in approximately 75 per cent of cases it can be passed into the pelvic colon. The limit of advancement is the apex of the sigmoid which varies from 12 to 14 inches from the anus. Aside from tuberculosis and diverticulitis the great majority of the gross lesions of the large bowel are within this accessible zone. Important inflammatory diseases such as amebic dysentery and chronic ulcerative colitis usually begin here and extend upward. Inflammatory strictures have their most common site in the rectum and next in the sigmoid. Non-malignant tumors as

adenomata papillomata and fibromata are encountered here most frequently and about 80 per cent of carcinomata of the colon occur in this bowel segment. These facts are a convincing argument that the simplest and most direct means for their recognition should be employed.

With x ray so readily available at present it has become a common practice to at once refer a patient having colonic or rectal symptoms for a roentgenologic examination. This is unfair to the patient frequently placing upon him an unnecessary burden in loss of time and expense and often deprives the roentgenologist of valuable data from which to reach a correct conclusion. The paramount factor however is the danger that sole reliance upon a negative roentgen report may foster a false sense of security. Meanwhile a lesion discoverable by the sigmoidoscopy may develop beyond the stage of hopeful therapy. *In fact the main instance of this kind which has come under his observation prompts the writer to stress this practical point in the early diagnosis of distal bowel pathology.*

Experience teaches that the order of the examination should be reversed. First sigmoidoscopy second x rays.

Roentgenogram may demonstrate gross pathology of the lower bowel such as inflammatory stricture or advanced carcinoma but digital palpation and endoscopy are simpler and usually more reliable methods. Solitary non malignant growth when small and still readily removable either by direct exposure or through the operating proctoscope casts no shadow. Clinical studies in recent years have shown conclusively that intestinal adenomatous and papillomatous foci frequently undergo malignant degeneration that they should be definitely considered precancerous lesions and should be removed immediately they are discovered. Moreover the form of the x rays yield in regard to the nature of the lesion is far less precise than that obtainable by direct inspection through the sigmoidoscope.

ILLUSTRATIVE CASES

A boy aged twelve for several weeks had diarrhea with bloody discharges. Roentgenogram of the colon revealed a

tive and no parasite were found in the stool. Proctoscopy revealed typical amebic ulcers of the rectum and a mold material from which showed under the microscope amebic colitis. Under a course of emetine by needle the symptoms promptly disappeared. Four weeks later the patient had gained 6 pounds in weight and the mucosa appeared normal to inspection.

A woman aged thirty years three weeks before examination had an acute onset of frequent stools (15 or 20 per day) fluid in character and containing some blood. Tenesmus was marked, loss of weight was rapid and the temperature ranged from 99.5 to 101.5 F. Radiograms showed only rapid emptying of the bowel and ptosis of the transverse colon. Sigmoidoscopy disclosed the picture characteristic of chronic ulcerative colitis. The patient responded favorably and promptly to appropriate dietetic and medical treatment plus autogenous vaccine.

A gentleman aged forty six years was referred for bleeding piles. X-ray of the colon were negative. Internal hemorrhoids were present but they were not actively bleeding. The sigmoidoscope disclosed at the level of 10 inches on the anterior wall of the pelvic colon an adenomatous polyp 3 cm long and 1 cm in diameter which bled freely on contact. This was removed by the electric snare after which hemorrhoidectomy was performed under local infiltration anesthesia with happy results.

A physician aged forty seven years had persistent mucous diarrhea over a period of six months. Radiograms showed spasm of the distal colon and he was treated for mucous colitis without benefit. A difficult sigmoidoscopy detected a villous tumor of the pelvic colon 12 inches above the anus. This was later successfully removed through the abdomen in another city.

A gentleman aged forty nine years had been under treatment for two months for bleeding thought to come from internal hemorrhoids. Radiogram then gave no conclusive findings but sigmoidoscopy showed a tumor in the sigmoid which a biopsy proved to be an adenocarcinoma. I did a resection of the sigmoid by the tube method of Balfour. Two and one half years have elapsed and the anatomic and functional results are excellent.

Many other cases of the same nature as those cited have been observed but a sufficient number have been noted to demonstrate the point.

My purpose is not to detract from the proved value and great merit of the x ray in diagnosis but to emphasize that in examination of the colon sigmoidoscopy should be first in order. On the contrary, if sigmoidoscopy is negative or the pathology found seems inadequate to explain the symptoms roentgenologic examination should always follow the endoscopy. For a satisfactory sigmoidoscopy the tube should be introduced 10 or more inches. When the anatomical conformation or pathological conditions bar passing the tube this distance an x ray study should be made also in any case in which a complete examination is desirable.

The x ray is our best means of determining the extent of involvement in chronic ulcerative colitis. It may reveal a stricture of the colon associated with a stricture of the rectum. It is our chief reliance in demonstrating diverticulosis of the colon and particularly diverticulitis of the sigmoid and may even show a double primary carcinoma in different colonic segments. Further the x ray data are frequently of the greatest value in determining the type of operation in carcinoma of the sigmoid and rectum.

The technique of sigmoidoscopy can be readily acquired by practice and attention to detail but naturally just as in cystoscopy or bronchoscopy experience is essential for the correct interpretation of the findings.

CLINIC OF DR HERBERT WILLY MEYER

LENOX HILL HOSPITAL

A CASE OF CANCER WITHIN THE BUCCAL CAVITY

THE case I am presenting today is that of a gentleman eighty two years of age who came under my care ten months ago. At that time he was suffering from a very advanced cancer of the angle of the mouth and the inside of the left cheek which had trans res ed onto a portion of the alveolar border of the left superior maxilla and which involved the skin near the angle of the mouth.

He had first noticed this lesion in November 1927 and observed that from that time on until January 1928 it had grown very rapidly. His home was in the Adirondack Mountains where he had lived for sixty years and at first he went to the local physician in the village who recognizing the seriousness of the lesion referred the patient to another physician in Glens Falls. He in turn referred the patient to an x ray therapist who refused treatment on the basis of the extent of the lesion and the advanced stage of the patient.

The doctor in Glens Falls however referred the patient to a physician in Albany for radium treatment. This doctor likewise refused radiation for the reason that he felt the extent of the lesion and the involvement of the skin of the cheek were almost contraindications to radium treatment.

In February 1928 the old gentleman returned to the mountain and did nothing further until June of that year when he consulted my father Dr. Willy Meyer who had gone to Lake George for his summer vacation. When I visited my father two weeks later we examined the old gentleman together and found that the tumor was ulcerating had grown rapidly and involved

Many other cases of the same nature as those cited have been observed but a sufficient number have been noted to demonstrate the point.

My purpose is not to detract from the proved value and greatness of the x ray in diagnosis but to emphasize that in examination of the colon sigmoidoscopy should be first in order. On the contrary if sigmoidoscopy is negative or the pathology found seems inadequate to explain the symptoms roentgenologic examination should always follow the endoscopy. For a satisfactory sigmoidoscopy the tube should be introduced 10 or more inches. When the anatomic conformation or pathologic condition bars passing the tube this distance an x ray study should be made also in any case in which a complete examination is desirable.

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The technique of sigmoidoscopy can be readily acquired by practice and attention to detail but naturally just as in cystoscopy or bronchoscopy experience is essential for the correct interpretation of the findings.

standpoint was very bad. Therefore we explained to the family—and also to the patient—that if we did nothing the future for the patient held out only suffering and that the one chance for relief lay in the field of surgery. A decision was rapidly reached. The patient was to come to New York for operation.

It is interesting to know that the probable predisposing cause of this lesion was a marked leukokeratosis which was present within the buccal cavity and which was probably secondary to smoking. Since the time when the old gentleman was a soldier in the Civil War he had been a heavy cigar smoker smoking almost continually throughout each and every day.



Fig 252—Photograph of the patient before operation. The patient is shown from the chest up, facing slightly to the right.

He was admitted to Lenox Hill Hospital on July 1, 1928. His Wassermann reaction was found to be negative. Vincent's angina infection was fortunately absent and plans for operation were made.

In this type of surgery we have learned to plan the operation carefully beforehand by making geometric diagrams and indicating thereon the amount of tissue that has to be removed and the method of reconstruction and repair to be employed to close the defect created by the removal of the diseased tissue. This was done as shown by the accompanying diagram (Fig 253).

all of the mucous membrane of the inside of the left cheek the angle of the mouth and that the ulceration had gone over onto the alveolar ridge of the upper maxilla. Examination of the cervical lymph node revealed a well developed node in the left maxillary alveolar region and of course a lymph node of equal dimensions of the buccal mucous membrane and upper maxilla was noted.

At this point let me say that examination of lymph nodes present in the upper maxillary alveolar region of the left side of the mouth with the gloved finger inside of the mouth against the floor and holding the finger tightly while the other palpating hand is on the outside in the upper maxillary region. Control movement of the finger will very rapidly enable one to pick up a very small lymph node between the finger and the inside of the mouth and the palpation is not in the outside of the neck.

The question is that it is for the diagnosis and not to come up. The general condition was quite satisfactory. Obviously he had not kept it at all but the pulse was soft and of good quality. There was very little evidence of articular disease and the kidney was functionally satisfactory. The question of what should be the diet was for the most part left with his family. If we had known that the ulcer for the remainder of his life was a very real one. Undoubtedly the lesion was going to break through the skin of the cheek with a heretofore not known. The method of treatment was really a slow way to deal with the disease. (1) reduction (2) surgery.

Since I have been able to handle the case since then the mouth we have seen it for the first time. It has been noted that the ulceration for the first time entirely upon the floor of the mouth. It is really a very small ulcer of the floor of the mouth. It is really a very small ulcer of the floor of the mouth. It is really a very small ulcer of the floor of the mouth.

Later at the same time I saw him with the same ulcer almost in the same place. It was really a very small ulcer of the floor of the mouth. It was really a very small ulcer of the floor of the mouth. It was really a very small ulcer of the floor of the mouth.

standpoint was very bad. Therefore we explained to the family—and also to the patient—that if we did nothing the future for the patient held out only suffering and that the one chance for relief lay in the field of surgery. A decision was rapidly reached. The patient was to come to New York for operation.

It is interesting to know that the probable predisposing cause of this lesion was a marked leukokeratosis which was present within the buccal cavity and which was probably secondary to smoking. Since the time when the old gentleman was a soldier in the Civil War he had been a heavy cigar smoker, smoking almost continually throughout each and every day.



Fig. 5.—Photograph of patient taken before operation. (Left) front view.

He was admitted to Lenox Hill Hospital on July 1, 1928. His Wassermann reaction was found to be negative. Vincent's anaerobic infection was fortunately absent and plans for operation were made.

In this type of surgery we have learned to plan the operation carefully beforehand by making geometric diagrams and indicating thereon the amount of tissue that has to be removed and the method of reconstruction and repair to be employed to close the defect created by the removal of the diseased tissue. This was done as shown by the accompanying diagram (Fig. 253).

all of the mucous membrane of the inside of the left cheek the angle of the mouth and that the ulceration had gone over onto the alveolar border of the upper maxilla. Examination of the cervical lymph nodes revealed a node palpable in the left submaxillary salivary region and of course a diagnosis of epithelioma of the buccal mucous membrane and upper maxilla were made.

At this point let me say that examination for lymph nodes present in the submaxillary salivary region is best done by fixating the floor of the mouth with the gloved index inside of the mouth against the floor and holding the finger steadily while the other palpating hand is on the outside in the submaxillary region. *Gentle movement to and fro will very rapidly enable one to pick up even a small lymph node between the finger on the inside of the mouth and the palpating hand on the outside of the neck.*

The question what best to do for this old gentleman now came up. His general condition was quite satisfactory. Occasionally his heart skipped a beat but the pulse was soft and of good quality. There was very little evidence of arteriosclerosis and the kidneys were functioning satisfactorily. The question of what he will be able to do for the thoroughly diseased mouth family. If we did not think the outlook for the remainder of his life was a very gloomy one. Undoubtedly the lesion was going to break through the skin of the cheek within a short period of time. The method of treatment over this we always have tried on in cancer (1) radium (2) surgery.

Since we have learned how to handle the case of cancer in the mouth we have added to the factor of oestrogen. It has been said that the local anesthetic property depends entirely upon the facility of technique all performed a good cancer operation that is whether it is possible to remove the lesion totally.

To treat this case with radium will mean to use the radium also in the form of an actual autogenous and indirect treatment lesion within the mouth and the outside of the cheek and the alveolar border of the upper maxilla. This would be such a hideously defect that the outlook for the old man from this

standpoint was very bad. Therefore we explained to the family—and also to the patient—that if we did nothing the future for the patient held out only suffering and that the one chance for relief lay in the field of surgery. A decision was rapidly reached. The patient was to come to New York for operation.

It is interesting to know that the probable predisposing cause of the lesion was a marked leukokeratosis which was present within the buccal cavity and which was probably secondary to smoking. Since the time when the old gentleman was a soldier in the Civil War he had been a heavy cigar smoker, smoking almost continually throughout each and every day.



Fig 22—Photograph of patient before operation. Note thickening of left gingiva.

He was admitted to Lenox Hill Hospital on July 7, 1928. His Wassermann reaction was found to be negative. Vincent's anaerobic infection was fortunately absent and plans for operation were made.

In this type of surgery we have learned to plan the operation carefully beforehand by making geometric diagrams and indicating thereon the amount of tissue that has to be removed and the method of reconstruction and repair to be employed to close the defect created by the removal of the diseased tissue. This was done as shown by the accompanying diagram (Fig 253).

where you will see the area to be removed and the amount of skin to be sacrificed from the upper and lower lip, the angle of the mouth and cheek. The accompanying photograph taken before operation (Fig. 252) shows the diffuse infiltration around the angle of the mouth. It is of importance in all the cases to take a photograph before operation as well as afterward in order to keep a complete record.

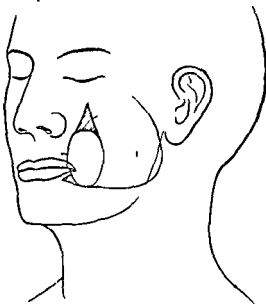


Fig. 252—Diffuse infiltration around the angle of the mouth. The area to be removed is indicated by the shaded area. The amount of skin to be sacrificed from the upper and lower lip, the angle of the mouth and cheek is also indicated.

Realizing that we could hardly do an extensive operation with a removal of a portion of the upper lip it was necessary to perform the operation under general anesthesia. This has been made possible by the use of the new technique developed in the New York Skin and Cancer Hospital by Dr. James T.

Gwathmey We employ colonic anesthesia in all cases of cancer of the mouth cavity and its use has made proper cancer surgery possible

On July 9 1928 the operation was performed under 4 ounces of colonic ether oil mixture with 2 drams of paraldehyde and grain of morphin with 1/150 of atropin

As shown in the accompanying diagram (Fig. 253) the area of skin of the upper lip cheek angle of the mouth and lower lip was marked out by superficial incision to indicate the portion of skin that would have to be sacrificed and removed with the tumor. A large cheek flap was thus outlined with the pedicle above along the infraorbital region nourished by the infraorbital vessels. This flap was then dissected upward consisting only of skin and subcutaneous tissue. Hereupon the incision was made through the full thickness of the upper lip on a line with the ala of the nose on the left hand side. This was carried through to the bony surface of the superior maxilla. The incision was then made through the lower lip and from there outward through the full thickness of the cheek close to the alveolar process of the lower jaw.

Having previously placed silk sutures through the upper and lower lip close to the incision line on the tumor side these sutures could be used as traction sutures and it became possible to visualize easily the ulceration on the inside of the buccal mucous membrane.

As soon as this could be visualized the entire ulcerating tumor was carefully cauterized and carbonized with the Post cautery. This is of great importance as in proper cancer surgery we must always keep in mind the constant attempt to prevent cancer cell implantation during a cancer operation. The incision was deepened through the upper portion of the cheek down to the outer surface of the upper maxilla over the antium. A small triangular area of skin just external to the ala of the nose as shown in the diagram was also removed as this would be necessary later on in order to permit the pedicle flap to swing in place.

With the bistoury and mallet an incision was made through the alveolar process of the upper jaw in front and then posteriorly

along the palatal plate of the left superior maxilla parallel to the alveolar margin remaining at a safe distance from the lesion which had transgressed onto the alveolar border. Then the external surface of the superior maxilla on the cheek was divided with the chisel opening into the antral cavity.

An incision was then made through the soft parts of the cheek along the ascending ramus of the mandible through the full thickness of the cheek just anterior to the anterior border of the

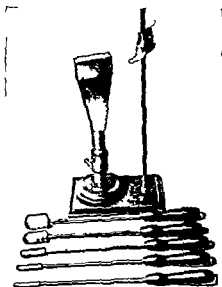


Fig. 54.—The graph of the case of the dog, D. Semk. d m d f
by E. m. 13 m d N. Y. k. l. j. l. solid g.

masseter muscle. This made it possible to remove the lymph nodes described by Buchholz in the buccal fat. The node of great importance in this type of case. With the chisel an incision was made through the posterior alveolus joining the former chisel cut which had passed posteriorly through the palatal process of the inferior maxilla. This freed the lesion so that it could be easily lifted away thus removing one mass the entire tumor with the skin of the cheek the whole

of the mouth a portion of the upper and lower lip the buccal mucous membrane and the adjacent portion of the superior maxilla. It is of vital importance to examine the specimen with the utmost care just as soon as it has been removed so that one may determine whether one is at a safe distance from all margins of the tumor.

In order to be doubly safe in this case it was found advisable to remove a little more of the posterior portion of the alveolar

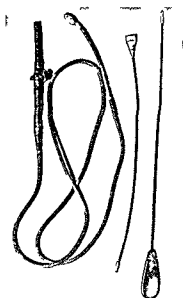


Fig 25 —Photograph of the instrument used in the operation.

process and of the palatal plate. This was done secondarily. The entire denuded area the margins of the wound and the superior maxilla were then carefully cauterized with a specially constructed gas cautery (Fig 254). An iodoform gauze packing was placed against the superior maxilla into the nasal cavity and held in place by crisscross mattress silk sutures. This completed the cancer removal operation.

The next portion of the procedure was the reconstruction

operation in order to repair the damage occasioned by the removal of the diseased tissue. Before the reconstruction operation was begun while the buccal cavity was wide open an Einhorn duodenal tube was introduced into the stomach with the special Einhorn tube introducer which permits one to push the tube into the stomach while the patient is under anesthesia (Fig 255). The free end of the tube was brought out through the right nostril so as to leave the mouth cavity empty.

The angle of the mouth was reformed by incising through the full thickness of the upper and lower lip just beyond the vermilion border as indicated on the diagram permitting the two flaps thus formed to be turned around and sutured to each other so as to form a new angle of the mouth composed of mucous membrane. It is very important to have an angle of the mouth formed by mucous membrane as this makes it easier for the patient to prevent leakage from the mouth which may more easily occur if there is a firm scar at the angle in the place of distensible tissue. The resulting two little tabs of skin on the upper and lower lip were excised. A Thiersch skin graft taken from the thigh was placed on the inner side of the previously prepared pedicle flap and sutured in place with No. 00 plain catgut to prevent displacement of the graft. The portion of the flap thus covered represented the new inner surface of the cheek. The graft was covered and protected by a strip of iodiform gauze placed against it and held in position by black silk mattress sutures. The skin flap was then swung forward and sutured into place with interrupted black silk suture. The resulting defect over the masseter muscle and the parotid fascia covered by the swinging forward of the pedicle flap was created in size as much as possible by undermining the posterior skin of the cheek and suturing it down to the masseter muscle with black silk sutures. The remaining nude facial area was covered with a Thiersch skin graft.

The operation took in all three and a quarter hour and during the procedure the route was followed of giving the patient a hypodermoclysis of 1500 cc of Ringer solution with 1 ampule of surgical pituitrin and 10 mm of 1:1000 adrenal. The

patient further received 1 ampule of metrasol and 1/15 gr of strychnin sulphate

The convalescence of the patient was a smooth one. He was taken out of bed twenty four hours after the operation and immediately received large quantities of fluids and nourishment through the Einhorn duodenal tube. The wounds healed by primary union. All sutures as well as the iodoform gauze packing within the mouth were removed on the fifth day postoperative.



Fig. 256—Photograph of specimen removed with skin flap. The specimen shows the amount of skin of the cheek and angle of the mouth that was removed and will also show the amount of ulcerating tumor mass on the inside of the cheek.

One week after operation the Einhorn tube was removed and the patient was allowed to swallow.

The accompanying photograph of the specimen (Figs. 256, 257) will show the amount of skin of the cheek and angle of the mouth that was removed and will also show the amount of ulcerating tumor mass on the inside of the cheek.

Pathologic examination showed a squamous cell epithelioma. Microscopic examination revealed a carcinoma presenting typical cancer nests and columns many of which were hollowed out by



Fig 27—Ph graph f pec m h g lcerat g t mo l f
heek



Fig 3—M ph graph fsect fth tum

necrotic or showed central cornification and cyst formation. The tumor deeply infiltrated the tissues of the cheek, reaching in places almost to the dermis. The mucous membrane of the cheek adjacent to the tumor was involved in the malignant process as was also a small area in the proximal part of the separate fragment secondarily removed and continuous with the growth. A microphotograph of the tumor is shown in Fig. 258.

Having learned from previous experience that all squamous cell epitheliomas must be considered as only a part of the cancer

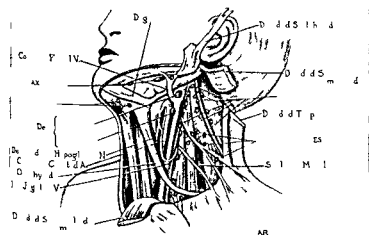


Fig. 259—Topography of lymphatic drainage of the buccal cavity (from Mott and Semken, "Surgery of the Neck," New York, 1908, p. 100).

field the removal of the cervical lymphatic structure on the side of the lesion was necessary (Figs. 259, 260).

Consequently three weeks after the first operation, again under colonic anesthesia, a block dissection of the cervical lymph nodes on the left side of the neck was performed. The technique used was the same as devised and worked out by Dr. George H. Semken, my Chief at the New York Skin and Cancer Hospital and described in detail in his chapter on Surgery of the Neck in Nelson's Loose Leaf Surgery.

The upper lymphatic structure were removed down to the



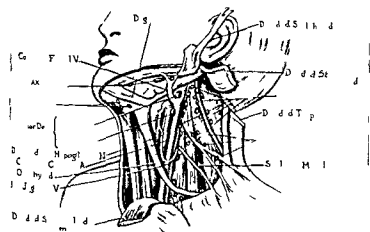
F —Photograph of papilloma tumor on side of
head.



Fg —Microscopic section of tumor

necrotic or showed central cornification and cyst formation. The tumor deeply infiltrated the tissues of the cheek reaching in places almost to the dermis. The mucous membrane of the cheek adjacent to the tumor was involved in the malignant process as was also a small area in the proximal part of the separate fragment secondarily removed and continuous with the growth. A microphotograph of the tumor is shown in Fig. 258.

Having learned from previous experience that all squamous cell epitheliomas must be considered as only a part of the cancer



Fg 29—T pog phy f lymph od gr p th k (fe M t fr m
S mk S g y f the N k N lso S g y)

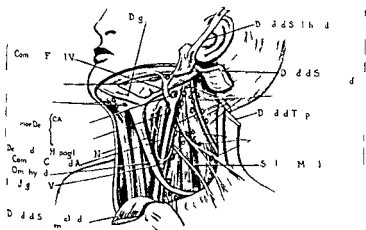
field the removal of the cervical lymphatic structures on the side of the lesion was necessary (Figs 259-260)

Consequently three weeks after the first operation again under colonic anaesthesia a block dissection of the cervical lymph nodes on the left side of the neck was performed. The technique used was the same as devised and worked out by Dr. George H. Semken, my Chief at the New York Skin and Cancer Hospital and described in detail in his chapter on Surgery of the Neck in Nelson's Loose Leaf Surgery.

The upper lymphatic structures were removed down to the

necrosis or showed central cornification and cyst formation. The tumor deeply infiltrated the tissues of the cheek, reaching in place almost to the dermis. The mucous membrane of the cheek adjacent to the tumor was involved in the malignant process as was also a small area in the proximal part of the separate fragment secondarily removed and continuous with the growth. A microphotograph of the tumor is shown in Fig 238.

Having learned from previous experience that all squamous cell epitheliomas must be considered as only a part of the cancer



Fg 29—T p g phy f lymph d gr p th k (ft M t f m
Semk S g ry f th N k N so S g ry)

field the removal of the cervical lymphatic structures on the side of the lesion was necessary (Figs 259-260).

Consequently three weeks after the first operation a skin under colonic anesthesia a block dissection of the cervical lymph nodes on the left side of the neck was performed. The technique used was the same as devised and worked out by Dr. George H. Semken, my Chief at the New York Skin and Cancer Hospital and described in detail in his chapter on Surgery of the Neck in Nelson's Loose Leaf Surgery.

The upper lymphatic structures were removed down to the



F — Photograph of specimen hanging from a string, showing the tumor at the neck.



F — Microphotograph of section of the tumor

neck of the tumor showed central cornification and cyst formation. The tumor deeply infiltrated the tissue of the cheek reaching in places almost to the dermis. The mucous membrane of the cheek adjacent to the tumor was involved in the malignant process. There was also a small area in the proximal part of the esophageal fragment secondarily removed and contiguous with the growth. A microphotograph of the tumor is shown in Fig. 255.

Having learned from previous experience that all squamous cell epitheliomas must be considered as only a part of the cancer

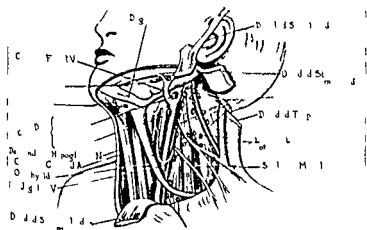


Fig. 255.—Tumors of the larynx and trachea. (From the collection of the New York Skin and Cancer Hospital.)

cell the removal of the cervical lymphatic structure on the side of the lesion was necessary (Fig. 259, 260).

Consequently three weeks after the first operation again under colonic anesthesia a block dissection of the cervical lymph nodes on the left side of the neck was performed. The technique used was the same as described and worked out by Dr. George H. S. S. my Chief at the New York Skin and Cancer Hospital and described in detail in his chapter on Surgery of the Neck in Nelson's Local Cancer Surgery.

The upper lymphatic structures were removed down to the



F —Photomicrograph of section of tumor on side of cheek



F —Microphotograph of section of the tumor

The postoperative course was all o very smooth. The wound quickly healed and all sutures were removed and the patient was discharged on the eighth day after the second operation return to his home in the Adirondack Mountains.

The various cervical lymph node groups were marked for identification as is our custom by various numbers of black

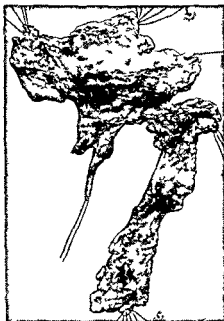


Fig 261—Ph t g ph f pe m f bl k d ct f th l ft r v l
 lymph d d g t D Semk t h N t bl k lk m k g
 th d l p th l g l b t ry f m t (1) L p l f p t d
 (2) m hy d d (3) po t d g t d (4) br t l d (5)
 ma l l ry d d h f d l g t l m l l ry t ry (6) l t
 l m t f p t d p r v l d d t t m hy d g

silk threads so that we might get a separate pathologic report of the various groups of lymph nodes. The lymph nodes within the lower border of the parotid showed chronic lymphadenitis with no neoplastic deposits. The lymph node of the omohyoid group showed marked congestion and edema but no evidence of neoplastic deposit. The lymph node of the posterior digas

posterior belly of the omohyoid muscle which level divides the upper lymphatic from the supraclavicular group. The group of lymph node removed within the closed envelope of the middle and deep cervical fascia represented the submental the submaxillary the lower pole of the parotid the carotid the posterior digastric the omohyoid and deep posterior cervical lymph nodes. The dissection was carried high onto the cheek along the external maxillary vessel onto the jaw in order to be sure to

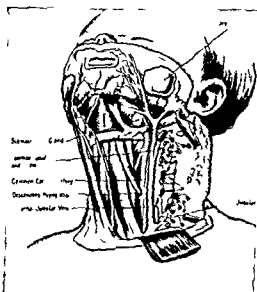


Fig. 60—Lymphatic region of the neck (Dissection from a patient undergoing surgery of the neck and throat).

reach the chief node lying along the external maxillary vessel. The wound was closed with interrupted black silk sutures. The accompanying photograph shows the specimen removed with the various group of cervical lymph node marked by black silk thread (Fig. 761). The operation lasted three hours and ten minutes. Before during the operation a hypodermic of 1000 cc of Ringer's solution was given a routine procedure.

Comment—We would like to make a few comments upon the principles underlying the plan of procedure in this case. The principles of cancer surgery within the mouth cavity have been especially developed by my Chief, Dr. George H. Semken, at the New York Skin and Cancer Hospital. The various technical points employed in this case were developed by him in his work in cancer surgery. The principles and these technical points alone have made possible extensive surgical procedures with comparative safety to the patients. We have ceased considering the element of age in this type of cancer surgery and would never refuse operation to any patient still technically operable. This case together with many others illustrates this point.

Colonic anesthesia according to the technique developed by Dr. Gwathmey and which is routinely employed in all of our cases where colonic anesthesia is indicated is a relatively safe procedure as is shown by this case of a man eighty-two years of age who had two colonic anesthetics within twenty-one days without any complicating after effects. Colonic anesthesia has made careful thorough surgical procedure possible without thought of the length of time consumed therein. This is illustrated by the fact that this patient was operated upon twice within twenty-one days, each operation lasting more than three hours. The after effects of colonic anesthesia are usually so nominal that it is possible to take the patient out of bed very early after operation, in this instance on account of the age of the patient, within twenty-four to thirty-six hours thereafter.

The routine administration of hypodermoclysis during operation provides the patient with a reservoir of fluid upon which his system may call if necessary and helps to prevent shock and collapse during or immediately following operation.

The introduction of the Einhorn duodenal tube into the stomach during operation in all cases of mouth cavity cancer enables us to give these patients large amounts of food and nourishment immediately following operation, keeping the mouth cavity dry and permitting rapid and good healing to take place.

The use of the gas cautery devised by Dr. Semken and

trich region showed congestion edema and moderate proliferation of the endothelial element. There were no neoplastic deposits. The lymph nodes in the submental region showed no neoplastic deposit nor did the lymph nodes in the submaxillary salivary region. The lymph nodes in the lowest limit of the posterior deep cervical dissection did not show any malignancy and the carotid lymph node showed only marked chronic lymphadenitis. Thus the pathologic report of the lymph nodes of the neck revealed no evidence of malignancy giving a much more favorable prognosis.



Fig. 6—Patient 1
posterior



Fig. 263—Patient 263
lateral

Ten months have passed since the operation. There is no evidence of recurrence of the cancer. Figures 262 and 263 show the cosmetic result with the scar of the cervical lymph node dissection two months after the operation. Since that time the edema of the flap has decreased in amount and the cosmetic result is even better. The elliptical Thiersch skin graft over the mastectomy incision could easily be excised under local anesthesia and a linear suture line be performed. This would however necessitate the return of the patient to New York which he is not very anxious to do.

which the cancer field is it seems to us to be our duty to remove this entire cancer field namely the primary lesion and the lymphatic drainage area.

This has been brought to our attention clinically by various cases which have taught us valuable lessons. We recall a case operated upon three years ago a splendid man who had a very small lesion in the floor of the mouth on the right hand side. He too was along in years. Under colonic anesthesia the typical upper lymph node dissection of the cervical region was performed removing all the groups of lymph nodes as in the case presented today as well as the entire floor of the mouth in one piece with the cervical lymph nodes thereby not crossing the cancer field in any place. The floor of the mouth was reconstructed and the patient made a good recovery. Pathologic examination showed a squamous cell epithelioma of the floor of the mouth with a metastatic deposit in the carotid lymph node overlying the internal jugular vein where the anterior group of lymphatics crosses to pass into the posterior deep cervical lymphatics. The lymph nodes in the posterior deep cervical lymphatics from the posterior digastric region down to the hiatus were formed by the posterior belly of the omohyoid muscle showed hyperplasia but no malignant deposit.

Our knowledge of the cancer field told us—or should have called to our mind—the fact that when there is a metastatic deposit in the carotid lymph node blocking the lymphatic stream it is impossible to know exactly where the lymphatic drainage would go. With this pathologic report we should have insisted upon the dissection of the supraclavicular lymph node which forms the end of the line of lymphatic drainage and from which point the lymph drainage passes into the blood stream. Not only because of the patient's age but because of the risk accompanying each operation as well as the disinclination of the patient for further surgery we advised careful follow up and examined the patient regularly at monthly intervals for a year. There was no evidence of recurrence.

One year after the operation the patient went to Europe. We examined him just before he sailed and were satisfied that

constructed for us by Eimer and Amend in New York City makes it possible to cauterize thoroughly and carbonize the raw surfaces in the mouth thereby destroying any possible remaining malignant cell and also erecting a barrier the eschar through which infection cannot readily pass from the mouth cavity into the lymphatic tissues. The cautery holds the heat cherry red for a sufficient time has a long narrow shank which will not burn surrounding tissues and comes in a number of sizes to be used in various locations and recesses.

The most important principle is the realization that we are dealing with a cancer field and that we must consider not alone the cancer lesion itself but also the lymphatic area into which the cancer lesion drains potentially or actually. In planning the procedure we must not be satisfied to remove the lesion alone. Just because we cannot feel any enlarged lymph nodes or we fear the risk of further operation we must not be satisfied to do only half of the work that must be done. It is a bitter disappointment to see a patient return with no evidence of the primary lesion but with a hard mass in a cervical lymph node not previously present. It is far easier and safer to operate in the cervical region and remove the lymphatic structure within their closed envelope of middle and deep cervical fascias before the cancer is there than to operate in these regions in the presence of active living cancer cells.

If the report from the pathologist shows only hyperplasia and simple lymphadenitis of the various groups of cervical lymphatics as it did in the instance of this old gentleman we must never feel that we have done an unnecessary operation but should on the contrary rejoice in the thought that we have done all in our power to prevent a metastatic recurrence of the tumor in the cancer field namely in the lymphatic drainage area. Dorendorf and Motz with many other anatomists showed many years ago that cancer cells pass into the lymph vessels and drain to the various cervical lymph nodes in the majority of cases and that those instances where the cancer cells pass directly into the blood stream to be scattered throughout the body are the rarer of the two occurrences. Knowing therefore

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One year after the operation the patient went to Europe. We examined him just before he sailed and were satisfied that

everything was all right. When he returned three months later there was a hard mass in the supraclavicular space with no evidence of recurrence of the cancer in the previously operated field. Again we operated but too late. We found a large tumor mass adherent to the internal jugular vein the wall of which had almost been perforated by the tumor. With the greatest difficulty we removed the sternomastoid muscle the tumor with the internal jugular vein and the supraclavicular structures. The patient recovered from the operation but within four months developed a diffuse cancer in the skin in the supraclavicular region from which a typical cancer *en cuirasse* spread out around his neck and from which he died a horrible death.

We cannot help but feel that if we had insisted upon the second operation a year earlier that is upon the dissection of the supraclavicular space after we had the pathologist's report of a malignant deposit in the upper lymphatic lymph node group we might have saved or at least materially prolonged the life of this unfortunate man. With such an experience ever constant and fresh in mind we will in the future insist upon the removal of the entire cancer field when it is indicated. We would rather perform what some may erroneously consider an unnecessary operation than to have a patient return with metastatic lymph node deposits which might have been prevented. Therefore in spite of the age of this patient presented today the cervical lymph node dissection was performed yet the report of the pathologist was only hyperplasia.

The absence of recurrence of the illness within the ten months that have elapsed since the operation we feel and hope that we used the proper judgment thereby able this dear old gentleman to continue his life without the terrible suffering that he would inevitably have endured had he not undergone surgical intervention.

CLINIC OF DR. RALPH COLP

FROM THE SURGICAL SERVICE OF DR. RICHARD LEWISOHN
MT. SINAI HOSPITAL

THE TREATMENT OF PILONIDAL CYSTS AND FISTULÆ

FOLLOW UP results of cases of pilonidal cysts and fistulæ have demonstrated quite conclusively that this simple condition is not always cured permanently by surgical procedure. Recurrences are not unusual in fact they occur so frequently that certain changes in operative technic must be made if results are to be materially improved.

Uninfected pilonidal cysts are rarely seen. The majority of patients referred for treatment are either those complaining of pain and tenderness in the lower sacral region or of an intermittent discharge of pus from this area. Physical examination in the first type may disclose a tender red fluctuating swelling surrounded by some cellulitis. In some a small medium dimple or fistula with a few stiff protruding hairs may be seen. In the second class of cases foul smelling pus will be observed exuding from a chronically inflamed fistulous orifice.

The treatment of these conditions is not difficult. It is invariably agreed that the cyst and fistula must be completely excised. The mooted point is how the resulting wound should be obliterated. In cases of infected pilonidal cysts simple incision and drainage is all that is indicated. This is rarely curative. It is extremely important that the patients be advised that this procedure is preliminary to a more radical operation and even if the wound should heal temporarily suppuration will invariably recur at some future time.

However when all signs of acute inflammation have subsided and a chronically inflamed fistula is present radical excision is indicated. It is an economic waste of time and effort

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There being no recurrence of the lesion within the ten months that have elapsed since operation we feel and hope that we used the proper judgment thereby enabling this dear old gentleman to continue his life without the intense suffering that he would undoubtedly have endured had we not urged surgical intervention.

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However when all signs of acute inflammation have subsided and a chronically inflamed fistula is present radical excision is indicated. It is an economic waste of time and effort

to attempt to eradicate the fistulæ by chemical injections or small medical incisions. Any treatment to be effective must excise the entire fistulous tract and its branches.

In the past two methods have been employed in the treatment of the cysts and fistulæ.

After the cyst or fistulous tract has been excised the wound is either widely packed with gauze and permitted to heal by granulation tissue or it is primarily sutured or partially sutured and drained at the lower angle. The first method which entails a

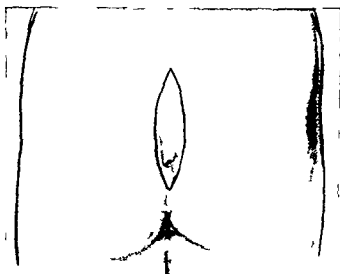


Fig. 64.—Diagram of a block dissection of the fistula.

long and a very long convalescence, a fairly good protection against recurrence. The second if successful is quicker. But surgical complication, however rare, is more frequent with suture because of the ineffectual methods to obliterate the dead space left between the sacrum and the sutured skin.

With a few to excise the fistula completely and a attempt to obliterate any dead space the following method has been found productive of excellent and permanent results.

It is a mistake to meticulously excise the fistulous tracts

by careful anatomic dissection. Fortunately they occur in a region in which a liberal excision of skin and subcutaneous tissue is practical. The external opening of the fistula is first injected with methylene-blue which not only indelibly dyes the tract but permeate any side branches or ramification. An elliptic incision is then made starting from about the region of the fifth sacral

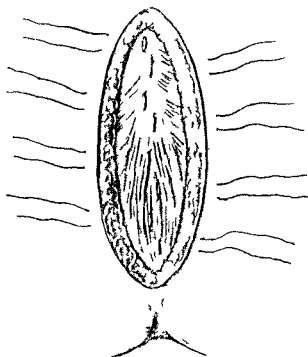


Fig 265—Sh g po t f m tt t h gh d m d k
fl p d yg ll g m t

vertebræ and terminating just about the external sphincter of the rectum and wide enough to include any lateral fistulous opening (Fig 264). This is deepened down to the sacral ligaments and laterally to the fascia over the gluteus maximus. As the incision is deepened a sharp lookout is kept for appear

ances of methylene blue and if seen a more liberal excision is made so as to include the lateral ramifications of the tract. This elliptic piece of skin and subcutaneous tissue with its content is dissected from the posterior sacrococcygeal ligaments and excised

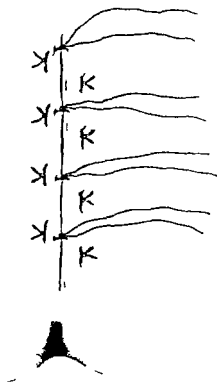


Fig. 266—M

t d d k pp sa d l rrup d
t th d f h h l f l g

as a solid block of tissue. An assistant then examines the specimen to ascertain whether the cyst or fistulous tract has been adequately and entirely excised. If so the wound is ready for suture. The same rules apply here as for the successful suture of any wound—asepsis and accurate hemostasis wound closure

without tension and the obliteration of dead spaces. The first obviously needs no comment but in order to suture this wound in which a block of skin and subcutaneous tissue has been excised it may be necessary to undermine the tissues over the sternal



Fig. 267.—Surgical treatment of piloid cysts.

muscles so that the lateral skin flap may be approximated easily. This should be done without hesitation but great care should be taken to insure careful hemostasis. However if the edges of the resulting ellipse are snugly brought together a dead space

ances of methylene blue and if seen a more liberal excision is made so as to include the lateral ramification of the tract. This elliptic piece of skin and subcutaneous tissue with its content is dissected from the posterior sacrococcygeal ligaments and excised.

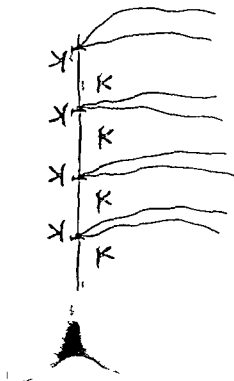


Fig. 266—Marsupial excision of the coccyx. The coccyx is removed and the coccyx is replaced.

as a solid block of tissue. An assistant then examines the specimen to ascertain whether the cystiferous tract has been adequately and entirely excised. If so the wound is ready for suture. The same rules apply here as for the successful suture of any wound—aseptic and accurate hemostasis—wound closure.

CLINIC OF DR LOUIS RENE KAUFMAN

FROM THE UROLOGICAL DEPARTMENT OF FLOWER HOSPITAL

TUMORS OF THE BLADDER AND PROSTATE WITH SPECIAL REFERENCE TO CANCER

In 1920 in the registration area of the United States embracing 82 per cent of its population the deaths due to carcinoma comprised 71,756 and over 11 per cent of all deaths over forty five years of age were due to carcinoma. Dublin has shown that with the decline of preventable diseases in recent years in early life such as typhoid fever more than 17 per cent of males and 13 per cent of females reached the age of fifty years in 1924 than did in 1910. But at the same time he estimates that in 1924 a boy of ten years stands nearly nine chance in one hundred of dying of carcinoma up to the age of sixty five years and a girl twelve chance up to the age of forty years. The liability of death from carcinoma has increased over 45 per cent and in 1924 the toll of cancer was well over 8000 for every 100,000 deaths. These figures bring before us in concrete form the frequency of cancer and challenge us to grapple with the problem. Cancer of the bladder is said to occur in from 0.1 to 0.2 per cent of all forms of cancer. In men between the ages of fifty and seventy death will come in a large proportion from cancer of the stomach, bladder or prostate.

In a consideration of tumors of the bladder and prostate we find such a large predominance of malignancy that the benign tumor fades into insignificance. Moreover recognition and treatment of benign tumors is so well understood that we may pass superficially over these to plunge into a discussion of cancer.

H P se t d w th l t l d b f mb d m t g f the St ff f
N R d H p t l d f th Cl l d H p th M d cal So ty
mb 13 1928 t Cl l d Oh

is sure to ensue between the sacrococcyx and the overlying skin and no amount of external gauze pressure can obliterate it as effectively as the method which has been used in our clinic. Each mobilized lateral skin flap is separately and securely tacked to the midline of posterior sacrococcygeal ligament by interrupted mattress suture of silk (Fig 765) and then a few interrupted sutures of finer silk approximate the skin edges (Fig 766). The ends of these sutures are left long and a roll of gauze is tied into place (Fig 767). No drainage of any kind is necessary and a regular dressing is applied with adhesive a certain regular pressure. If the wound remains clean and the temperature is normal the first dressing is done on the eighth day and the sutures removed.

This method not only shortens the time of convalescence but follow up results have shown that the majority of these patients remain permanently cured.

revealed a well encapsulated tumor the size and shape of a baseball which was found to be a pure fibroma

In a discussion of benign tumors we recognize that these lesions are potentially malignant from the clinical side but delay has not the fatal consequences of delay in the frank cancer group In cancer of the bladder and especially of the prostate delay in diagnosis is the outstanding factor in our dreadful mortality This delay is inevitable because of the failure of the disease to cause subjective symptoms early enough to bring the patient



Fig 268—Cytology of bladder tumor. The image shows a large, dark, irregularly shaped mass, likely a tumor, protruding from the body. The mass is surrounded by lighter, possibly inflamed or necrotic tissue. The image is somewhat grainy and has a high-contrast, almost graphic quality.

under observation at a curable stage This is illustrated for instance by a case which was referred to us at the Flower Hospital of massive carcinoma involving the entire bladder with wide pread metastasis in a laborer of fifty four who had continued hard manual labor up to two weeks before his admission This quality of cancer of the bladder and prostate to escape early clinical recognition is one of the most tragic clinical features of the disease

with so much still unsettled in its early diagnosis and adequate treatment

BENIGN TUMORS

The most frequent form of benign tumor of the bladder is papilloma—an epithelial tumor histologically benign but as we all know clinically malignant because it is prone to recur or reappear. It bears a great importance to the subject of cancer of the bladder because it was through the development by Edwin Beer of New York in 1910 of cystoscopic fulguration by the Oudin current that the modern era in the handling of cancer of the bladder was born. Through this procedure a study of tumors of the bladder was developed and in rapid succession came the application in 1915 of radium and in this epoch the brilliant work of Beer, Squier, Young, Chute and the Mayo Clinic in the surgery of tumors of the bladder and prostate.

Tumors of epithelial structure constitute about 90 per cent of all bladder tumors. In papilloma the diagnosis can be made with accuracy by cystoscopy and the result is universal agreement as to our ability to cure the patient of his lesion by electrodesiccation through the cystoscope or by suprapubic exposure with or without radium implantation or application. Recurrence—or what is more frequent, reappearance—of a new tumor requires further treatment. Excision with electro or cautery coagulation of the base is now and then necessary. We have observed one patient seventy years of age who five years after excision of a benign papilloma developed two new tumors which were treated by cystoscopic desiccation with apparent cure.

Other benign tumors of the bladder are rare. In the last five years we have seen one case of angioma which was excised by Dr. Horace Ayer with apparent cure; also one case of leiomyoma operated in our service which will be reported in detail by Dr. Leonard Paul Werhube.

The benign tumors of the prostate are even more infrequent. We have seen and operated only one single case—a man thirty-two years old with classical symptoms of prostatic hypertrophy presented a large smooth tumor of the prostate remarkably spherical causing retention and infection. Perineal operation

Hematuria is usually accompanied or followed after a varying interval by increase of frequency with urgency and often with agonizing tenesmus although pain is rarely complained of independently of micturition. Urinary disturbance is more marked when infection occurs and becomes a pathetic feature in the terminal stages of the disease. Later on nerve root pains become prominent in the back, pelvis or suprapubic region from metastasis or toxic effects produce typical cancer pain and cachexia.



Fig 20—Photomicrograph of tissue section showing typical features of carcinoma of the bladder, including nests of cells and glandular structures.

The first symptom is therefore hematuria which should always excite the suspicion of cancer of the bladder when it occurs in a man in the late fifties and more so the older the patient especially in the absence of symptoms of urinary obstruction and particularly in the absence of pain. Cancer of the prostate combines frequency and difficulty of urination with an absence of hematuria. Bleeding is not a symptom of cancer

CANCER OF THE BLADDER

The most conspicuous and often the only symptoms and practically always the first symptom is hematuria insidious capricious or constant and often characteristically accompanied by the passage of pure blood at the end of micturition. It is generally more marked in the papillary type situated in proximity to the sphincter but while it is the earliest symptom it is



Fig 269—Open type malignant papillary tumor of the bladder. Radical cystectomy. (See Fig 260)

no criterion of the size of the tumor nor of the type. A benign papilloma may have more acute and persistent bleeding than the most malignant slowly growing carcinoma. Hematuria had existed for from two weeks to several months in our own cases with or without other symptoms which attracted the attention of the patient. Lynch found symptoms present for from one to four months in 10 per cent of 115 cases and Judd reports the average duration of symptoms as twenty-six months in 181 cases.

of the base with slough and ulceration. Definite hardness of a bladder tumor as noted by touch with a wire or the catheter through the cystoscope mean malignancy especially when associated with sloughing of its surface and associated cystitis.

It is often extremely difficult to establish a diagnosis between benign and malignant papilloma which may require trans

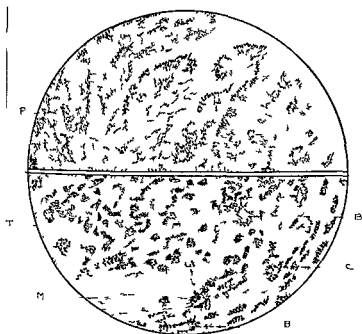


Fig 271—C m f bl dd W d ly fil t t g l g bl dd
 t t C t t d d m mpl t t Th p t t p t d
 m l g m t f th gl t k d y (Se Fg) P P pl ry po
 t T t t M m l B bl d l C t f ea m
 cell

cystoscopic extirpation of a specimen. Buerger states that in most cases the acquisition of malignancy from the clinical standpoint goes hand in hand with the appearance of definite histologic changes in the type of growth and that these should be recognized by the expert pathologist and that the tissue presenting such changes is accessible to the Roncur forceps.

of the prostate which is essentially a dry fibrous type of tumor whereas on the other hand the large engorged soft glandular type of tumor found in benign hypertrophy of the prostate is likely to spill blood periodically from trifling cause.

Hematuria demands cystoscopic examination and the same responsibility rests upon observation of the tumor through the cystoscope that rests upon observation of a section of tissue through the microscope for a decision as to its pathology. Final confirmation is often extremely difficult even in the hand of the most expert. Cystoscopy becomes increasingly difficult because of hemorrhage and spasm in a bladder just sufficiently irritated by the presence of a tumor to become convulsed by any type of instrumentation. Caudal anesthesia is usually necessary for satisfactory study.

The vast majority of cancers are situated in the triangle usually in immediate proximity to the ureter or prostatic region. We believe the most practical classification is that which divides tumors of the bladder into

I Papillary

(a) Benign

(b) Malignant

II Carcinoma

(a) Papillary—usually pedunculated benign papillary

(b) Sessile—benign

(c) Infiltrating

(d) Sessile— $\begin{cases} \text{T papillary} \\ \text{T sessile} \end{cases}$ —tubercled (cervix glandular)

But for practical purposes we may divide malignant tumors into infiltrating and papillary. The former are characteristically flat or sessile often beefy or solid prone to necrosis or ulceration with changes in the color the result of infiltration with a peripheral or wide prostatic inflammatory reaction. Papillary carcinoma either primarily malignant or in the case of malignant degeneration of benign papilloma which Buege has shown occur not infrequently present irregular coarse fronds which opaque fusion of papillae with irregular thickening nodulation

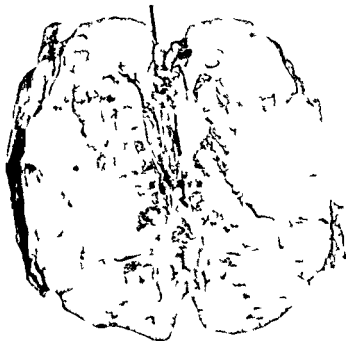


Fig 273—Alm t m pl t pl m t f l t t by m
Ph t g ph f pl t my pe m h g sold m



Fig 274—Se t t m f l f k d y N m l t y t se f
p t t b l d d d d l

Colston state that except in rare instances trans cystoscopic removal of specimens has been discontinued at the Johns Hopkins Hospital Deaver advises against cystoscopic removal because of danger of exciting hemorrhage and opening lymphatics for further infiltration I have discontinued it not only for those reasons but because I have always failed to get accurate information from such sections



Fig. 72.—Th m m d b b d m l ph ec my (l g
t pen l pe) d p l es hesia week f p p b
pe

Occasionally a tumor may be diagnosed when only hyperplastic inflammatory reaction of the bladder exists I have seen one case diagnosed a carcinoma during the active stages of pronounced papillary acute cystitis which recurred just six weeks Lower and Joelson have recently reported 3 cases diagnosed as tumor of the bladder one of which proved to be tuber

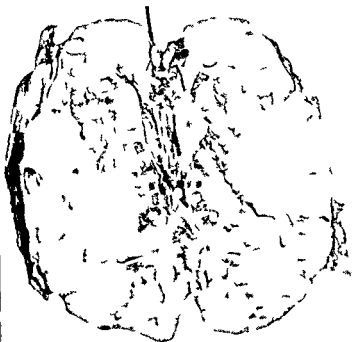


Fig 23—Alm t m pl t pl m t f l t t by
Ph t g ph f ph t my p m h w g l d ca m



Fig 24—Set t m f l f t k d y t m l t y t t f

culosis and 2 case due to inflammatory hyperplasia secondary to contiguous pelvic infection to which they add reports of

(a) Case report by Roth of tuberculosis

(b) Two cases of inflammatory reaction at mouth of di er t tula reported by Kaellenthaser

(c) One by Cimeno of inflammatory reaction from foreign body

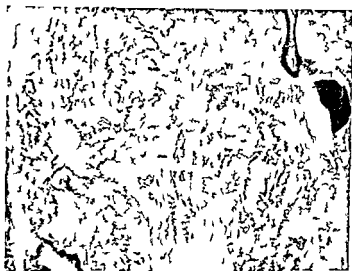


Fig 25 Section p t t Sam se At psy th bl dd l t
f d ll h l d f f m lth gl se f p t t h d
f l t t A psy mall m d sc d ppe pol f l ft
k d y Th p t t p se t d m f th p t bl dd l t
ght and l ft k d y d p e l h t d m t bl l on f h
bd m h gl d l l em

In diagnosis I find th t the cystogr m t one of our mo t useful aid in affordi g a idea of the t nt of the tumor n influencing us as to its op r b lity In the x y study in our service we take a series of flat expo u es coveri g th whol tract including not only the pel c bo es but the upper thi d f the femurs and the ent e sp ne d supplemented where r we plan a radical attack by x v tudy of the lo g bones and skull

Cancer of the bladder is limited practically throughout its course to the wall of the bladder and seldom if ever metastasizes although the vast majority of cases present infiltration widely spreading and finally invading the perivesical and pelvic structures. Visceral and skeletal metastasis which is so common in carcinoma of the prostate is rare in cancer of the bladder. But those cases in which there is infiltration of villous papillary carcinoma through the wall of the bladder which are evidently primary in the prostate but have assumed the full clinical course

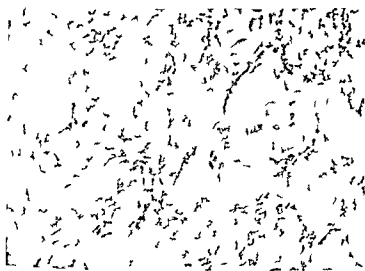


Fig 276—Section of prostate showing infiltration of bladder wall. Although the wall of the bladder is infiltrated by the tumor, the prostate gland itself is not involved. The tumor is villous papillary carcinoma of the bladder.

of cancer of the bladder show a tendency to bony metastasis and the symptoms often clearly indicate spinal metastasis.

As a rule the first symptom which brings the patient with cancer of the bladder under observation is hematuria, since this is the only universal symptom. Tumors of the vault may remain long silent, whereas those of the trigone will excite irritability. Fragment extrusion in the urine can occur only in the

case of papillary growths and associated cystitis is more frequent with the large flat infiltrating tumors

As soon as infiltration occurs along the trigone which is the natural biologic law of carcinoma it produces that peculiar leathery feel which is characteristic of involvement of the base of the bladder. This may be felt along the floor of the bladder both in the female on vaginal examination and in the male on rectal examination as a hard irregular mass in the plateau of the space between the seminal vesicles.

The lethal element of cancer of the bladder is the steady progressive involvement of the bladder itself with constant damage to urinary function with resulting hydronephrosis, pyelonephritis and pyonephrosis with ultimate sepsis and toxemia which resist all forms of treatment. These fatal qualities occur even when the growth remains limited to the bladder itself since usually an inflammatory reaction occurs.

CANCER OF THE PROSTATE

If we exclude sarcoma we shall find all tumors of the prostate will group themselves into inflammatory (chronic prostatitis, simple abscess or tuberculo) benign hypertrophy (adenoma or glandular hyperplasia) and carcinoma. Carcinoma of the prostate occurs in well over 20 per cent of all cases. Wilson and McGath report that of 489 prostates removed at operation 15.5 per cent were malignant and Judd estimates in a later report that of the Mayo material 20 per cent is malignant. Hu and Young reports the incidence as 1.01 per cent in his series of cases. We are convinced therefore to realize that carcinoma of the prostate is a very important and not infrequent cause of urinary difficulty.

It occurs as an adenocarcinoma or a scirrhus type of growth similar to scirrhus of the breast with some chondrosarcomatous formation as to make it a hard firm type of tumor. This is potentially the most malignant type of tumor because when disturbed by any form of operation it exhibits with extraordinary tendency to spread. Beginning in the prostate it may grow slowly within the prostate and promptly invade the lymphatic stream so that invasion results in widespread metastasis seeking out and flourishing

in the glands of the pelvis and spreading to areas as remote as the supraclavicular chain or else metastasizing in the lungs or bones. Bony metastasis occurs in about 25 per cent of all case



Fg 277—C p t t d l l d d P g t l (S Fg 28)
 T t d b y t s c p d m m p l t t t h l f f h m t D t h
 m t h f m t m f i t b r v t f y f t d m



Fg 28—P g t d s e f k l l t l w t h m f p t t Ray
 l m t f k u l l p e l b l m l t b æ f b o t h t b æ

involving the medulla and produces osteogenetic changes in the sacrum pelvis or spine and even such lesions of the femur or humerus as to cause spontaneous fracture. Such metastasis may produce distant carcinoma secondary to a nodule in the prostate so small as to escape accurate recognition except at autopsy. Spinal metastasis may cause symptoms of tumor of the cord. Another curious liability of bone changes is the frequent occur-



Fig. 29—Sh. g p. ee bl dd th ca ci m p m ry p t
d fil t g bl dd N t gul ty f t d t l p o-
j t f p t t

rence of Paget's disease which we have found in about 5 per cent of all cases.

It may occur in association with benign prostatic hypertrophy and will be recognized only at the time of operation or in the microscopic study of the operative specimen. Such malignant degeneration offers perhaps the best prognosis and seems generally to have a less malignant course. It may occur as an enlargement of the prostate of an irregular nodular type the

nodules being stony or woody hard extending up and along the fascia of Denonvilliers this type causes marked urinary symptoms and finally the growth will extend laterally and literally choke the pelvis with carcinoma.

Carcinoma of the prostate will not only encroach on the bladder outlet or urethra but frequently breaks through into the bladder wall. Such extension produces a clinical picture exactly like primary cancer of the bladder that it is often impossible to determine the exact pathology.

It occurs at the age of sixty five. Bumpus in a study of 1000 cases found only 4 cases before the age of forty five and none below the age of forty two before which age malignancy takes the form of sarcoma. It causes relatively few symptoms and usually causes death within a period of two to three years from the onset of the first symptom.

The most frequent symptoms in actual practice is severe pain along the sciatic nerve or in the back due to metastasis and involvement of the nerves. Such pain in a man past fifty should always excite the suspicion of carcinoma of the prostate and lead to rectal examination which shows alteration in either the contour or consistency of the prostate irrespective of its size. In 65 per cent of all cases there is some form of urinary disturbance either increased frequency or difficulty or tenesmus. Retention of urine is rare early in the disease but becomes progressively more frequent and pronounced in the later stages when the growth shuts down on the urethra. The absence of retention and of hematuria and the characteristic findings on rectal examination should differentiate between simple hypertrophy and carcinoma in which there is a striking disproportion in symptoms and the degree of urinary disturbance.

TREATMENT OF CANCER OF THE BLADDER

Excluding benign papilloma for which trans cystoscopic electrocoagulation or radium application are acknowledged specifics we are discussing only the frankly malignant neoplasms of the bladder.

Treatment may be arranged in the following table

CLASSIFICATION TREATMENT

I *El t g l t*

1 F d cal

() B gn pap ll m

(b) M l g t p p ll m — t t l type

S g cal (p p b)

() M l g t p p ll — pe bl ca ma f type
pe lly pe bl q m cell

(b) W th d se t p p ll ry ca m

II *C t*

1 El t t ry

2 Th m l ca t ry

W th h t se t

W th d m th t se t

I pe bl t m

III *R d t*

1 R d m

() S f ce ppl cat

(b) Impl t t — d m m t pe m t m bl

2 Deep y th py

IV *S g l*

1 Segm l se t

2 W d h th t

() T pl t t f

(b) L g t f

3 T l ey t t my h

() N ph my t t my

(b) T pl t t f t gm d

Surgery—The general consensus of opinion as to surgical management is well summarized by Chute. Nothing short of very radical surgery includes the implantation of ureters and the removal of the bladder will meet this situation. I am firmly convinced of the fact that we have to do more radical operations than we have been doing if we are going to cure cancer of the bladder. In situations along the lines of dictal surgery I believe bid fair to give better results than experimentation along the lines of fulguration of the ureter of radium. In our enthusiasm for these newer things we must not forget that careful surgical removal of bladder tumors probably gives good results

as anything else Dr J H Cunningham states that the results of a series of cases treated by various method coincides with results at other clinics and that resection gives the best results Dr John B Deaver states that resection of bladder tumors where there is no cause for transplantation of the ureter is the method of choice but extensive resection with transplantation of one ureter or extirpation of bladder with transplantation of



Fig 280—Pt t g d f ty th Sp p l y t t y t g f
t ty fi f t f ll d by l g l t g y t A th g ff ty t
m k d ggr t f ty d t l l p x bl ca m f p
t t l g t g th d th m th l t f m l h g d sep
N t l ght p t t t w th f ly l l l l ca ty

both ureters is never justifiable Young states that there is no doubt that resection where possible is the most satisfactory form of treatment in cases of infiltrating carcinoma Judd states radical operations are already accomplishing the most and a factor for bad results is tardy operation after a trial of other methods

CLASSIFICATION TREATMENT

I *El t oag l t*1 *E d es l*() *B gn pap ll m*(b) *M l g t pap ll m — t t l type*2 *S rgical (p p b)*() *M l gn t pap ll m — pe bl ca m f y type*
pe lly pe bl q m cell(b) *W th d sect pap ll ry ci m*II *C t*1 *Fl t ca t ry*2 *Th m l ca t ry**W h th t sect**W th l m th t se t**I pe bl t m*III *R d t*1 *R l m*() *Su f ce ppl cat*(b) *Impl — d m m t pe m t m tl*2 *Deep y th p*IV *S g l*1 *Segm t l sc*2 *W d th h t*() *T pl t t f t*(b) *L gat f*3 *T al cy my th*() *N ph my t my*(b) *T pl f gm d*

Surge y—The general consensus of opinion as to surgical management is well summarized by Chute. "Nothing short of very radical surgery in including the implantation of ureters and the removal of the bladder will meet this situation. I am firmly convinced of the fact that we have to do more radical operation than we have been doing if we are going to cure cancer of the bladder. Irrigation along the line of radical surgery. I believe it is fair to give better results than experimentation along the lines of fulguration or the use of radium. In our enthusiasm for these new things we must not forget that careful surgical removal of bladder tumors probably gives as good results

time and either transplanted or ligated. Bleeding is seldom profuse and after ligation the defect in the bladder is closed by a double row of sutures with a 1/2 inch suprapubic drain brought out through the lower angle of the incision and one or two cigarette drains placed external to the bladder in the pelvis. Indwelling catheter is not used. Layer closure with fine silk for the skin completes the operation. One of the important factors in the success of the operation is the eradication as much as possible of previous infection and careful technic with we believe the additional safeguard of cleansing the entire operative area with 1 per cent mercurochrome preceding the final closure of the abdominal wall.

One of the most important problems is treatment of the ureter in extensive resection. The experience of the Mayo Clinic shows that ligation of the ureter of the affected side where the other side is competent to carry on renal function offers better results. Dr. Hunt reports that in a series of 45 cases in which the ureter was ligated there was six postoperative deaths (13.3 per cent) in which autopsies showed acute pyelonephritis in all cases. In 53 cases in which transplantation was done there were 16 deaths (30.1 per cent) caused by ascending infection and the ultimate results were better in the case in which ligation had been done. Decision as to the area to be removed must always be determined by the known tendency of carcinoma to infiltrate so that in the vast majority of cases it will not be sufficient to excise only the immediate zone of the tumor. In those tumors manifestly infiltrative a wide pedicle block dissection should be done to remove all the tissues related to the cancer-bearing area exactly similar to the attack in cancer of the head face or neck region. In the infiltrative tumor with invasion of the muscular wall of the bladder our slides show carcinoma cells seeping into normal tissue scattered in so many directions that we feel that the area of resection must not only be extensive but that it must also remove all possible extravesical implantation. Wide excision means in depth and in surface. In cases in which the tumor has a definite prostatic invasion the lobe of the prostate or the entire gland should be removed with

While operation is an extremely complicated procedure we believe that it is the only method which offers any reasonable hope of permanent cure in cancer of the bladder and as our experience grows and from our study of the literature this is the method on which we should concentrate. Radiation particularly the use of radium can be combined with operation or used subsequent to operation to far better effect than is a plan in which sole dependence is placed upon its therapeutic efficiency.

Our experience in radical resection has been limited to 70 cases and in the last year I have been able to standardize the operation. There has been no immediate operative mortality and of the 70 cases 60 are alive five years after operation and one two years after operation without apparent recurrence of metastasis. After preliminary study and accurate localization the operation is done usually with gas-oxygen anesthesia with local block and in 2 cases we have used spinal anesthesia with satisfactory results. With air distention and the patient in a high Trendelenburg position a median incision extending above the umbilicus if necessary to afford wide exposure affords opportunity for palpation. The pelvis is carefully explored. In about one half of our cases we have used a transperitoneal exposure of the bladder which we much prefer. The bladder is completely mobilized either just before or after an incision is made in the dome of the bladder to determine the exact topography and localization of the tumor. The site of the tumor is then thoroughly flushed with 95 per cent alcohol which follows the suggestion of Beer is allowed to remain in contact with the tumor area which is packed off with gauze packs. The peritoneum is thoroughly walled off with gauze and the wounded es protected throughout to avoid any possible implantation. The resection is started as a rule by cautery or electrodesiccation section through the mucous membrane and through the wall of the bladder including an area not less than 3 to 5 cm beyond the base of the tumor and is then completed by sharp and blunt dissection removing as far as possible not only bladder wall but the perivesical areolae. If the tumor is located at all near the ureteral aperture the ureter is sectioned at this

flavine complete mobilization of the bladder usually trans-
 pentoneal careful delimitation of the tumor by peripheral desic-
 cation or even the complete destruction of its surface by bipolar
 desiccation treatment of the ureter—all the e are factors which
 determine the success of the operation

Radical cystectomy offers great difficulties but it should be
 performed oftener and it will become I am convinced a more
 frequent operation in the future Cases suitable for cystectomy
 are not common We attempted the operation in a woman of
 seventy who presented a tumor limited to the trigone and sphinc-
 ter region she died one week after the first stage operation of
 implantation of both ureters into the sigmoid as a result of local
 infection and peritonitis

In a review of the literature manifestly incomplete we have
 found reports of 2 cases of total extirpation of the bladder by
 Lout and a very splendid result of Beer B M Garmsen has
 attempted the use of the small intestine in the formation of an
 artificial bladder after cystectomy Work along similar lines in
 providing a radical operation has been done by Naogali Damski
 says that in spite of the high mortality of transplantation fol-
 lowed by total extirpation of the bladder it is the only pro-
 cedure that offers even temporary relief Federoff advise total
 extirpation by the two stage operation he show in 321 case of
 one stage operations a mortality of from 50 to 60 per cent
 Bristow has reported 11 case with a two stage operation with
 out any operative mortality In discussing the radical treat-
 ment of cancer of the bladder Judd states that with more
 experience cy tectomy can be made a reasonably safe and satis-
 factory operation

In reporting result of radical excision Squier (segmental
 resection) reports 28 case alive from two to eight years after
 operation out of 45 case operated 27 died after operation and
 20 showed recurrence or metastasis Kidd of England had 13
 cured out of 28 partial cystectomies Judd quotes Hann and
 includes cases reported by Bumpus reporting 238 case living
 out of 708 cases treated of the e 5 ten years 62 five years 94
 three years average range of life of 36.7 months Of the e cases

the emmal vesicles the areolar tissue and fat to insure complete lymphatic excision (Fig 281)

Broder's classification is without doubt a very important guide and I believe we should avail ourselves of it far more generally than we are doing at present

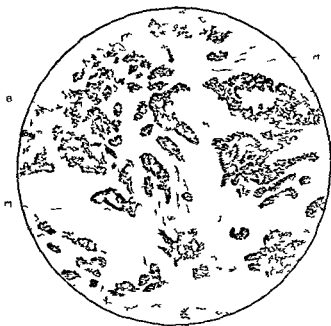


Fig 41 Papillary carcinoma of the bladder. (H. E. stain, 10x magnification). The illustration shows a cross-section of the bladder wall with a large, irregular, darkly stained area representing the tumor. The tumor is composed of many small, darkly stained cells, some of which are arranged in a papillary pattern. The surrounding tissue is lighter and more homogeneous. The tumor is located in the center of the bladder wall, and it is surrounded by a layer of muscle. The tumor is in contact with the bladder lumen, and it is surrounded by a layer of connective tissue. The tumor is in contact with the bladder lumen, and it is surrounded by a layer of connective tissue. The tumor is in contact with the bladder lumen, and it is surrounded by a layer of connective tissue.

Beer emphasizes the value of filling the bladder before final closure with alcohol to kill stray cells and report a further refinement of technic in the use of the radiotherm knife and searing the edges of the bladder before closure. In the radical operation irrigation after preliminary irrigation with acetic

should not follow radium since results are always poor. Keyes states that in 25 cases on whom 35 operations were done—with one postoperative death—death occurred in from four to fourteen months postoperative. Keyes in speaking of the management of carcinoma says: "I have found that radium gives better results than surgery. I am sure that radium is an ideal agent for the control of infiltrating tumors. I do not know that excision is any better. Through the suprapubic route he removes the bleeding projecting part of the tumor with electric cautery to afford thorough exposure of the base for the implantation with destruction of any small secondary papillary tumors by fulguration or actual cautery with immediate complete closure of the bladder (drainage to space of Retzius). An important detail in his technic is the avoidance of infection and cystitis making possible early recystoscopy to catch recurrence."

Loun states that out of 57 cases treated by radium cystoscopically plus fulguration 67 per cent are well, 24 per cent are unimproved or dead due to recurrence and 14 per cent are dead due to other causes or not followed. He states that the combination of radium plus fulguration gives very satisfactory results for the treatment of malignant papilloma of the bladder and should be tried before any more radical measures are considered. The results in cases treated by application of radium other than cystoscopic were uniformly bad although these were all very advanced cases. The results in 28 cases treated by implantation by the suprapubic route of which 75 per cent were nonresectable infiltrating carcinomas should not discourage further attempts at this therapy. There were 4 cases apparently well with 22 deaths from recurrence. He also states that deep x-ray therapy affords little benefit although it at once diminishes the intensity of any pain due to nerve involvement.

Barringer in reporting his case reports 15 per cent as cancer free of 20 cases of papillary carcinoma of the bladder; only 12 were proved by pathologic examination or 60 per cent of the total. He reports out of 51 cases of infiltrating carcinoma 18 as cancer free but of these only 23 were confirmed by pathologic

43 were treated by radium and fulguration with average range of life of 36 1 months

14 were treated by radium and cauterization with average range of life of 10 7 months

79 were treated by radium with excision or resection with average range of life of 21 5 months

219 were treated by operation alone with average range of life of 18 5 months

Young reporting a series of 380 cases reports 27 per cent of five year cures out of 51 cases of resection. Lower reports 108 cases of cancer of the bladder of which 81 were operated with an operative mortality of 9 8 per cent of whom 61 per cent died the majority within one year of operation with 22 cases living. There were 18 recurrences many of which yielded to further treatment and he makes the important statement that good results in the treatment of recurrences are due to the fact that recurrences are nearly always local and very seldom metastasize.

Rad at on —Barringer states that radium is superior to surgical removal because it can cope with inoperable cases. His work is representative of radium therapy. Reports in general do not indicate more than a control of the symptoms and arrest of the progress of the growth and of course a much lower primary mortality rate. Beer in 65 cases treated by radium had 60 per cent of good results in papillary carcinoma and 35 per cent in the infiltrating form. In non-resectable growths at near the sphincter radium was employed with a mortality of 33 per cent and only 6 out of 31 cases were cured. In 17 cases in which he used x-ray there were no cures. Watter who advises operation in the infiltrating type reports no cure in the 25 per cent of his 67 cases in which combined radium and x-ray were used because the tumors were inoperable. Kilborn employs deep x-ray emphasizing as fire exposure. Barringer prefers the intravesical or transurethral route. Although Keyes on the other hand prefers the suprapubic method of radium implantation. Bumpus states that radium alone is not successful although useful with fulguration or operation. p ratio

should not follow radium since results are always poor. Keyes states that in 25 cases on whom 35 operations were done—with one postoperative death—death occurred in from four to fourteen months postoperative. Keyes in speaking of the management of carcinoma says: "I have found that radium gives better results than surgery. I am sure that radium is an ideal agent for the control of infiltrating tumors. I do not know that excision is any better. Through the suprapubic route he removes the bleeding projecting part of the tumor with electric cautery to afford thorough exposure of the base for the implantation with destruction of any small secondary papillary tumors by fulguration or actual cautery with immediate complete closure of the bladder (drainage to space of Retzius). An important detail in his technic is the avoidance of infection and cystitis making possible early recystoscopy to catch recurrence."

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Barringer in reporting his case reports 75 per cent cancer-free of 20 cases of papillary carcinoma of the bladder; only 12 were proved by pathologic examination or 60 per cent of the total. He reports out of 51 cases of infiltrating carcinoma 18 as cancer-free but of these only 23 were confirmed by pathologic

examination—45 per cent. Including 5 cases in which no pathologic diagnosis was made there were 32 deaths in his series of 51 cases. He states bluntly that "I have found radium gives better results than surgery." Today radium is the method of election in controlling bladder tumor.

Deaver and Mackinney express the opinion that radium has accomplished little in the cure of cancer of the bladder and hastened a fatal termination in many cases in which it was employed.

Electro- and Chemo-coagulation—The recently perfected technic of powerful high frequency currents bid fair to revolutionize our attack especially in cases of high malignancy in which surgery is probably contraindicated. Heist Bover used the suprapubic route reflecting as much as possible of the tumor and make an application which Beer shows after all is merely the application of the same type of electric de-coction advocated by him. The same diversity of opinion exists in the use of this method as in the use of radiation for we find Doe in contrast who expressed the opinion that high frequency treatment is a palliative method but cannot be considered a radical method. Kolischer advises the use of the resoulation d'athermy machine with low voltage and high ampage by the suprapubic method. He states that the primary mortality is not more than 10 per cent and that the remote results are good by virtue of the so called peithermic zone—a zone rapidly filled with round cell fibroblast and leukocytes which zone should respond to operative radiation. His final conclusion is that it may be safe to state that at the present time electrocoagulation ought to be the method of choice in dealing with malignant tumors of the bladder. Electric de-coction is unquestionably the outstanding method for these inoperable tumors which cannot be removed surgically for which you will then elect either actual cautery as our only resource. A palliative measure in the arrangement of hemorrhage it offers powerful weapons and cures are being reported although it is much too early to express a final opinion as to its value. Eugene Joseph in January 1921 proposed chemocoagulation by the application of trichloroacetic acid to

the tumor which it seems to me should be of value in certain cases Drexler and Ginsberg report 50 case and describe the method in detail

TREATMENT OF CANCER OF PROSTATE

In the management of carcinoma of the prostate palliation is the only possible remedy in that large proportion of cases which show metastasis so that radical operation can be thought of only in a relatively small proportion of cases Bumpus has shown in an analysis of 1000 cases that the duration of life in which no treatment whatever was instituted was thirty one months in the cases in which operation for supposed benign hypertrophy had been done and had revealed cancer there were only 21 cases that showed a five year cure in the 164 cases operated that is in the very earliest possible clinical state of malignancy In a group of 35 cases treated by radium the duration of life was only sixteen months In 122 cases treated by implantation the duration of life was only twenty two months In 125 cases in which permanent suprapubic cystotomy without other form of treatment the duration of life increased to fifty seven months

The radical removal of the prostate was proposed by Leisrink in 1882 and has been especially developed by Hugh Young But in general permanent cystostomy without efforts at radical operation are found to give a lower operative mortality and a longer life with or without the use of radium Cunningham reports that following perineal operation with the use of radium 19 patients died within ten years and 10 patients survived one of these requiring permanent suprapubic cystotomy for recurrent obstruction a second required five operations for recurrent obstruction with a persistent perineal sinus He speaks of radium as a therapeutic crutch for the terminal states like opium

The indication for treatment in cancer of the prostate is not only for the removal and the arrest or cure of the cancer but as well for the relief of urinary obstruction Barringer has shown in the careful study of his cases and is supported by other observers that apparently the best results in the control of cancer

It is only by utilizing all the means at our command in diagnosis and by urgent careful study of all those symptoms which often trivial in themselves nevertheless are often the early



Fig 283 —C m f ght half f t g th t ral oc l
Ph t gr ph f pe t p c m h g hyd t R se t f m th
ph t h g tt h d pe l f t (seg t l se t)

manifestation of carcinoma that we shall be able immeasurably to better our results We should approach the problem always in a spirit of optimism tempered by a realization of the grave



Fig 284 —Sh g pe t p f f ght h lf f th
bl tl t l yd t th t l g th t l po t f th p
j th t l pe t

m a f cancer to the patient and above all by an avoidance of all procedures which hasten mortality or general extension of the formidable lesion

CONCLUSIONS

- 1 The most important sign of cancer of the bladder is hematuria & high demand cystoscopy in all patients past the age of fifty
- 2 It is essentially a local disease with little or no tendency for metastasis but with extraordinary infiltrative qualities
- 3 Its lethal element is renal damage with exhaustion and sepsis
- 4 It occurs as a papillary type a malignant form of squamous cell carcinoma and a slowly infiltrating type
- 5 Treatment requires knowledge of the type of growth its location and above all its morphology and for this Broder's classification offers invaluable aid
- 6 Radical operation transperitoneal or extraperitoneal offers the only guarantee of cure in all cases in which the growth is resectable with transplantation or high ligation of the ureter where necessary
- 7 Total cystectomy with preliminary transplantation of the ureters into the sigmoid as a two stage operation should be done more often
- 8 Radium therapy has received altogether too much attention since it does not establish any final cure in the frankly malignant tumors With or without decaecation it may cure small papillary tumors employed through the cystoscope by the suprapubic route
- 9 Irradiation is useless except as a palliative of pain and occasionally of hemorrhage
- 10 Surgical diathermy (electrocoagulation) is an ideal procedure in surgical resection to destroy the tumor and sufficient ament in inoperable cases in checking the growth of the tumor
- 11 The most important signs of cancer of the prostate are pain & urinary difficulty demanding rectal examination in men past fifty
- 12 The liability of metastasis and extension in cancer of the prostate overshadows the relatively small potential focus of malignancy

- 13 Radium is an ideal agent in limiting the return of the growth combined with the palliative operation for the relief of urinary obstruction
- 14 Permanent suprapubic cystotomy offers the best outlook in general combined with radium radical prostatectomy is limited to a very small group of cases

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CLINIC OF DR RICHARD W BOLLING

ST LUKE'S HOSPITAL

CARCINOMA OF THE LEFT COLON PARTIAL COLECTOMY BY THE MULTIPLE STAGE EXTRAPERITONEAL METHOD OF MIKULICZ

DIAGNOSIS in the majority of patients with cancer of the colon is made late in spite of the increased accuracy of roentgenographic methods and their routine employment in abdominal disorders with vague and atypical symptoms. It is deplorable but none the less true that a considerable proportion of these patients reach the operating table in bad condition depleted from a wasting disease and often with more or less obstruction. They are consequently poor subjects for any type of operation.

In general resection of the colon for cancer carries the highest operative mortality of any common abdominal operation. This is partly due to late diagnosis and partly to the dangers inherent in anastomosis of the large intestine. Some twenty six years ago von Mikulicz formulated the advantage of the multiple stage operation which ordinarily bears his name. It may be said in passing that the name of Volkmann Reclus Block and Paul might with at least equal justice be associated with this type of operation. The Mikulicz operation as practiced at the present time consists in a wide mobilization of the involved intestine with its regional lymphatics. After suturing of the serous surfaces of the afferent and efferent portions of the intestine at a sufficient distance from the growth to permit of wide resection the involved intestine with its attached regional lymphatics is delivered through the wound. The incision is closed to the emergence of the intestine after suture to the parietal peritoneum. This is all accomplished without opening

the intestine. Each limb is then crushed with a small Payr clamp and the intestine cut away with the actual cautery or with a knife followed by carbolic acid and the clamps left in position. After twenty-four to forty-eight hours the clamp on the proximal limb is removed and a rectal tube introduced. When obstruction is marked it may be necessary to introduce a tube into the proximal limb at the time of the operation. In seven to ten days a clamp preferably of the Mikulicz type is applied to the perianal area and in four to seven days the continuity of the intestine is reestablished. Subsequently after a varying period the remaining fecal fistula may be closed—it rarely closes spontaneously. The operation may be applied to any portion of the colon above the recto sigmoid but is particularly applicable to the transverse and left colon. In a series of 33 cases operated on at St. Luke's Hospital there were 2 operative deaths. The disadvantages of this method are delay in healing and prolonged convalescence with a temporary colostomy. Immediate healing with prompt restoration of function is obviously more desirable but we are convinced that the greater safety of operation in more than one stage must fully compensate most patients for the delayed convalescence and its associated discomforts. We do not exclusively advocate the multiple stage procedure but wish to call attention to its relationship and to urge its use in the average case as it comes to the hospital reserving the one-stage operation for the occasional case particularly adapted to this procedure. In the event of acute intestinal obstruction any form of operation should of course be preceded by preliminary colotomy.

To lay I wish to present to you 3 patients which illustrate the advantages of this method.

Case I—This patient, of whom I am about to operate for closure of a fecal fistula remaining after a Mikulicz resection, was first operated on thirty-two days ago. Her history is of marked constipation, soreness and occasional sharp pain in the lower left abdomen, especially in the evenings. There had been no nausea or vomiting, no loss in weight and no change in the

character of the stools. Physical examination showed an obese woman of fifty nine years 66½ inches in height weighing 194 pound who was otherwise essentially negative save for a tender mass about 10 cm in diameter situated in the left lower quadrant of the abdomen. Examination of the colon by clyster showed complete obstruction in the lower descending colon. During her stay in the hospital preceding operation the temperature ranged from 98° to 100° F with a consistent daily evening rise. The preoperative diagnosis was carcinoma or diverticulitis involving the descending colon.



Fig. 85—Rtg g m ft p q l m h g l f
d l g l C se l

First Operation—Under general anesthesia a left rectus incision about 20 cm long was made. On opening the peritoneal cavity an indurated mass about 10 x 12 cm was found involving the lower portion of the descending colon. This mass was firmly fixed by adhesions to the posterior abdominal wall. The proximal uninvolved intestine showed some thickening of its wall but was only lightly distended. With considerable difficulty the mass was freed from its attachment posteriorly and the adjacent lower and gonadal lymphatic vessels mobilized. The large

amount of fat on the intestine and in the mesentery made immediate suture practically impossible. The sigmoid was long and after mobilization was easily applied to the upper portion of the descending colon and the afferent and efferent limbs united by suture for a distance of 3 inches. The growth with the attached mesentery was delivered and after suture of the parietal peritoneum to the two limbs the wound was closed to the emergence of the intestine. A small Payr clamp was applied to each limb just beyond the skin and the growth with its attached lymphatics was cut away. The cut edges of the intestine were cauterized with carbolic acid. The specimen removed was 25 x 15 cm and the pathologic report was carcinoma. Convalescence was stormy for several days. On the second day the clamp on the proximal limb was removed and a tube introduced. On the ninth day the spur was clamped and the clamp came away six days later. There was considerable infection of the wound which has somewhat delayed the closure of the remaining fecal fistula. Today we are about to close this fistula. The field of operation is cleaned and a gauze placed introduced into the fistula. The fistula is surrounded by an elliptical incision. The incision is deepened through skin and subcutaneous tissues to the rectus sheath. The sheath is then carefully dissected free and the muscle separated down to and through the posterior sheath. The intestine is now free everywhere but is attached only to the peritoneum. While I have in this particular instance been able to avoid opening the peritoneum this is not always so. However such an operation apparently makes little difference if it is recognized and closed by suture. Now I carefully trim away the edges of the stomach so that I may appose raw surfaces. The stomach is closed transversely first with a continuous suture of twenty-day chromic gut. This is turned in by a series of interrupted sutures of the same material. The muscle is brought to either by interrupted chromic suture and the skin and subcutaneous tissues closed with silkworm gut. In a considerable proportion of cases there is some leakage of intestinal contents for a variable time after operation but in only one instance have I found a second loss of consciousness.

Case II—The next patient a woman of sixty-one years was admitted to the hospital December 30 1928. The history was that for two years she had had at intervals of two or three months attacks of nausea and vomiting and diarrhea. There was no loss of weight or strength until two months ago when the attack was accompanied by severe abdominal pain constipation and abdominal distention. Physical examination revealed an emaciated elderly woman. The abdomen was distended and there was a mass made out in the left iliac region.



Fig 28c—R t g m ft p q l C se II h g b t
t d d g l

An opaque clyster revealed obstruction in the lower descending colon. Hemoglobin 55 per cent red blood cell 4 000 000. By means of colon irrigations the distention was materially reduced. I saw her for the first time on January 6 1929 and operated on January 8th.

Incision. Under the left rectus abdominis a left rectus incision 16 cm long was made. About mid-way of the descending colon the carcinoma was firmly attached to the posterior

abdominal wall the lower portion overlying the external iliac vessel. With considerable difficulty the mass was freed and the colon above and below widely mobilized. The left ureter was firmly attached to the mass and was carefully heated with twenty-day chromic catgut above the growth just below the kidney pelvis and below the growth at some distance from the bladder. The redundant sigmoid by wide mobilization was easily applied to the afferent limb of the upper descending colon. The serous surface of the two limbs were united by suture for a distance of 2 inches. The growth with its attached regional lymphatics was delivered and the abdominal wound closed to the emergence of the two limbs. After the application to each limb of a Payr clamp the intestine was cut away and the cut end cauterized with carbolic acid. The specimen was 28 x 6 cm and the pathologic report was adenocarcinoma of the colon, nodes not involved. Convalescence was uneventful and no symptoms occurred which could be attributed to ligation of the ureter. There was ample output of urine. On the second day the clamp on the proximal limb was removed and a tube introduced. On the eighth day the Mikulicz clamp was applied to the spur and the continuity of the intestine was established five days later when the clamp came away. At this time and for some days thereafter there was considerable rectal tenesmus and a tendency to diarrhea. On February 9th under ethylene anesthesia the fistula was closed.

Case III—This patient, a well-developed man of forty-nine years, was admitted to the hospital on October 25, 1928. He complained chiefly of having suffered for the past few months from marked constipation and gaseous distention. Blood had been noted in the stool for the past two or three weeks and there had been an occasional tendency to diarrhea. Physical examination revealed a well-developed and well-nourished man apparently in good health. Abdominal examination was negative. Examination by opaque chyme showed obstruction of the sigmoid. On sigmoidoscopic examination the growth could not be visualized but blood was noted to be coming from above.

On November 1st the patient was operated on with a diagnosis of carcinoma of the sigmoid. Under ethylene-oxygen ether sequence a lower left rectus incision about 16 cm long was made. On opening the peritoneum a mass about 6 x 6 cm was found involving the lower sigmoid. The intestine itself was free but the mesentery was thickened and indurated drawing the involved intestine back toward the sacrum. The dissection of the mesentery was difficult and I was unable to determine how



Fg 297—R tg g m ft p q l m C. se III h g

much of the blood supply was cut off during my mobilization of the involved loop. The lower limit of the growth was about 6 cm above the peritoneal reflection. The sigmoid above the growth was long and after wide mobilization this was brought down, applied to the relatively short limb below the growth and the serous surface united by suture. On account of the short distal limb the parietal peritoneum was freed widely on each side of the abdominal incision and united to both limbs below the point where resection was contemplated. The tumor

with its regional lymphatics was delivered and the abdominal wound closed to the emergence of the intestine. A Pavr clamp was applied to each limb and the intestine cut away with a knife. The edges were cauterized with carbolic. The specimen removed was 14.5 cm. in length. There was 3 cm. of normal mucosa below the growth and about 1.5 cm. above. The pathologic report was adenocarcinoma, nodes not involved. On the third day the clamp on the proximal intestine was removed and a tube introduced. Convalescence was complicated by bronchitis and moderate wound infection. On the twelfth day the spur was clamped and the continuity of the intestine was established seven days later when the clamp came off. On December 4th under ethylene anesthesia the remaining fistula was closed. There was no leakage of fecal material; the wound healed without complication and the patient was discharged on December 21, 1938. Since discharge he has gained over 20 pounds in weight, bowels are regular, the wound has healed without weakness and he has been at work since early in January.

CLINIC OF DR. MAXIMILIAN A. RAMIREZ

FRENCH HOSPITAL

ENDOSCOPY IN BRONCHIAL ASTHMA

In a previous article on this subject published about two years ago St. George and Ramirez reported fairly favorable results in a series of 75 protracted cases which had failed to respond to the ordinary form of treatment. Two groups were represented both having an associated bronchitis, bronchorrhea, etc. In one the asthma was found to be caused by one or more specific proteins; the other group comprised cases which failed to give a skin reaction—the so-called non-allergic type. It was in the latter variety that the greatest benefit was derived. Although improvement was noted in a small percentage of the specific allergic cases, there were no cures.

While bronchoscopic inspection and therapy *per se* demand recognition as a valuable measure, the discomfort to which the patient is subjected is a consideration not to be regarded lightly. The introduction of this instrument as a strenuous treatment and arouses much opposition toward the frequent repetition of a procedure indicated in most of these cases. It is for this reason that a less objectionable method has been sought.

The technic now employed consists in the administration of medicated solution through a small catheter introduced into the trachea with the aid of a Jackson laryngoscope and directed into either primary bronchus by changing the position of the patient. Through this special catheter, which has a small weight at the distal end, lipiodol may be introduced for diagnostic purpose or a weak solution of dilute nitrate or weak

R m M m l A d St Geo b A V Th B h sc p
T t f B h l A h M t J d l i 125 32 M h
2 19 7

iodin solutions or better still a solution of hexylreocinol (S T 3) which is the substance we are now using and which has given most encouraging results.

Although it is realized that a good part of the benefit following the bronchoscopic procedure may be due to the actual mechanical stretching of the bronchi with the instrument this advantage is more than counterbalanced by the more frequent repetition of the therapeutic measures made possible by our present less strenuous method. This in addition to the administration of autogenous vaccines frequently has to be continued for several weeks.

In most cases seen there has usually been a considerable amount of thick tenacious mucus firmly adherent to the bronchial wall. The mucous membrane is generally of a reddish blue color and appears swollen lax and somewhat sooty. However the picture presented has not been sufficiently constant to warrant its being regarded as characteristic.

Among the organisms most frequently found are the *Micrococcus catarrhalis*, *Streptococcus viridans*, *Staphylococcus aureus*, *Pneumococcus* and *Streptococcus hemolyticus*. Cultures should be made preferably from the secretions deep in the bronchi. The organisms isolated from bronchial culture differ in many instances from those found in the sputum.

CONCLUSIONS

1. Results are more encouraging when the primary focus of suppuration is located in the tracheobronchial area than when it is located elsewhere.

2. Vaccine made from deep bronchial culture seems to be more effective than autogenous vaccines prepared from the sputum.

CLINIC OF DR. CARL EGGERS

LENOX HILL HOSPITAL

ACUTE PANCREATITIS

W. S., a woman thirty seven years of age, was admitted to the Lenox Hill Hospital as an emergency case at 11:30 P. M. on March 17, 1928, complaining of abdominal pain and vomiting. Her illness had started suddenly seven days previously with agonizing epigastric pain which made her double up and temporarily lose consciousness. A physician diagnosed a gall stone attack and gave a hypodermic injection of morphin which brought temporary partial relief. The following day the severe pain returned and she began to vomit frequently. There was also sharp cutting pain between the shoulders. This condition had continued until admission with only temporary partial relief after morphin administration. Her bowel had moved. There had been no clay colored stool. There were no urinary symptoms.

There was nothing in the past history of importance. She had never had a previous similar attack, had never been ill and had never been operated on. She had been married for seven years and had been pregnant three times, two pregnancies resulting in difficult deliveries and one in an abortion. She was in excellent health at the time of the acute onset of the present illness.

On admission she was an obese, sick looking woman with lips and a coated tongue. The lips were somewhat cyanotic. There was no jaundice. Examination of the head, neck, heart and lungs was negative.

The abdomen was distended. There was no fluid wave. There was marked tenderness over the entire abdomen, most

iodin solutions or better still a solution of hexylresorcinol (S. T. 31) which is the substance we are now using and which has given most encouraging results.

Although it is realized that a good part of the benefit following the bronchoscopic procedure may be due to the actual mechanical stretching of the bronchi with the instrument the advantage is more than counterbalanced by the more frequent repetition of the therapeutic measures made possible by our present less strenuous method. This in addition to the administration of autogenous vaccine frequently has to be continued for several weeks.

In most cases even the expectorates usually been a considerable amount of thick tenacious mucus firmly adherent to the bronchial wall. The mucous membrane is generally of a reddish blue color and appears swollen lax and somewhat soggy. If we see the picture presented has not been sufficiently constant to warrant its being regarded as characteristic.

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CONCLUSIONS

1. Results are more encouraging when the primary focus of suppuration is located in the tracheobronchial area than when it is located elsewhere.

2. Vaccines made from deep bronchial cultures seem to be more effective than autogenous vaccines prepared from the sputum.

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On admission she was an obese, sick looking woman with dry lips and a coated tongue. The skin was somewhat cyanotic. There was no jaundice. Examination of the head, neck, heart and lungs was negative.

The abdomen was distended. There was no fluid wave. There was marked tenderness over the entire abdominal moi-

marked across the upper portion. There was no rigidity. No enlarged liver or gall bladder could be palpated and there was no abnormal mass.

Vaginal examination showed a badly lacerated cervix with a long anterior lip and considerable purulent discharge. The uterus was in good position of normal size and movable without producing pain. The adnexa were free.

Rectal temperature 100.6 F. pulse 98, respiration 24.

A urine examination showed the presence of albumin, no sugar, a few casts, few white blood cells and a few red blood cells.

The blood showed white blood cells 16,800 with polynuclears 80 per cent.

The patient evidently had general peritoneal irritation which taken in conjunction with the other findings and the history pointed to gall bladder disease with an associated acute pancreatitis.

Taking into consideration that the patient had been ill with the same symptoms for a week we decided to delay operation until various laboratory tests could be carried out and to clarify the diagnosis.

She was given a hypodermic of morphine and a Morphine drip and allowed to rest through the night.

A careful examination on the following day strengthened the belief that we were dealing with an acute pancreatitis. The gall bladder was evidently involved but gall bladder disease alone could not give a picture of such an extensive process unless it had ruptured and in the course of a week that would probably have given rise to a peritonitis or to localization under the liver. Intestinal obstruction, perforation of the duodenum, infection or a peritonitis starting from the pelvic organs or the appendix could all be ruled out by the absence of signs pointing to those organs.

Various laboratory examinations were made with the following results. The blood count was repeated and showed 15,700 white blood cells with 84 per cent polynuclears. Urine showed albumin 2+ a few hyaline and granular casts, a few

pus cell and a few red blood cells. It was negative for sugar and bile. Leucin and tyrosin were present.

Blood chemistry was reported to show

Urea	14.8
Creatinine	1.0
Uric acid	2.7
Serum	126
CO ₂ combination	6.4

Tests for liver function

Van der Berg	
Dubin-Slader	
Phosphatase	
Fifty	
Fifty	
Seventy	

A Roentgen ray study was made for the purpose of demonstrating the gall bladder. The preliminary picture showed a small rounded shadow in the region of the gall bladder which was interpreted as a gall stone. The Graham test proved unsatisfactory on account of the vomiting.

An abdominal puncture was done resulting in the withdrawal of a drop of liquid which on culture showed colon bacilli.

Conservative treatment was continued and the patient improved somewhat. Vomiting became less and finally occurred only once a day.

The Wassermann examination was negative. The urine continued to contain albumin and casts and on one occasion there was 1 per cent of sugar.

The temperature rose to 101° F or a little higher every night for a week and after that to 100° or 100.2° F. A little pain and considerable tenderness persisted and for this reason we did not feel justified to discharge the patient but advised operation for the removal of the associated lesion, the diseased gall bladder.

Operation was performed March 28, 1928, eleven days after admission and eighteen days after the onset.

A right rectus incision was made. There was no free fluid

present and no fat necrosis was noted in the superficial parts. As soon as the deeper portions were exposed however there was some hemorrhagic fluid and very extensive fat necrosis was still present in some places forming plaques by fusion. The pancreas itself felt hard and nodular the peritoneum overlying it was densely adherent and gave a puckered appearance and there was considerable hemorrhagic infiltration. The liver was about normal size had a thick rounded edge but otherwise looked normal. The gall bladder was rather small thick walled and hidden away under the liver. No stones could be felt. In order to expose it properly a Mayo Robt on extension had to be added to the incision.

The impression we had was that the pancreatitis had run its course and was subsiding apparently without equestration of any portion of the gland and without secondary cyst formation. We decided therefore to direct our attention to the associated and perhaps predisposing gall bladder disease. Cholecystectomy was decided on and carried out beginning the dissection at the fundus. The stump of the cystic duct was cauterized. The peritoneum was not sutured. A cigarette drain was inserted and the abdomen closed around it in layers.

Cultures had been taken of the fluid surrounding the pancreas as well as of the bile. Both were later reported negative.

Examination of the gall bladder showed it to be thick walled and edematous. The contents of bile was lightly turbid. It contained one portion of the mulberry type about 1/2 inch in diameter. The pathological report was chronic cholecystitis. The patient made a good recovery.

The subject of acute pancreatitis is a very interesting one. Most surgeons come in contact with the condition from time to time and if one bears in mind certain features of the disease it is possible to recognize it with a reasonable degree of accuracy. The most interesting thing about it is its etiology. Opinions vary a great deal regarding the cause of the disease. Some authorities believe that entrance of duodenal contents or bile into the pancreatic duct with subsequent infection or fermentation sets up the disease process while others believe it the result of

infection carried to the pancreas from without by way of the lymphatics. Both clinically and experimentally a number of factors can be adduced to support either theory. As it is difficult to produce conditions in normal animals which may spontaneously appear in human being in whom associated pathologic processes are present it is manifestly not easy to correctly interpret the results of such experiments. For this reason I will confine myself to the clinical aspect of the disease as it has presented itself in the cases which have come under my observation. In all of them there was associated gall bladder disease and it has seemed to me

1 That the gall bladder and bile in some way were connected with the development of acute pancreatitis. Most of the patients had stones and one a diseased thickened gall bladder. Just what the relationship was whether bile actually entered the pancreatic duct or whether a gall stone or spasm of the sphincter temporarily obstructed it and caused increased pressure with the subsequent rupture of the pancreatic duct is impossible to state positively. It does appear though that something took place to affect the entire gland at once for the onset in all cases was acute and very severe. In several patients slight jaundice was noted and sometimes bile was found in the urine and the bile color index of the blood was increased. All these points speak for the close association of the two conditions. If one admits that bile may enter the pancreatic duct under certain conditions one may ask whether normal bile may be able to produce acute pancreatitis. There are authorities who say this and again others who have experimental proof that it is possible. In the clinical case however one is not dealing with normal bile but with bile chemically altered by gall bladder disease or the liver. In addition to the presence of gall bladder disease we have autopsy findings which indicate that the inflammatory process probably started from the pancreatic duct. Its mucous membrane was discolored by bile and of the same color as that of the common duct and the destructive process within the gland was most marked in connection with the duct. It seems that only a process acting through the duct or through the

circulation can affect an entire gland so suddenly and so severely. None of the patients had any inflammatory symptoms preceding the acute onset and even after the onset some time elapsed before temperature and increased pulse developed. This increase was probably the reaction to a chemical irritant and not the result of a primary inflammation. Cultures taken during the acute stage from the peritoneal fluid, the retroperitoneal exudate and the gall bladder showed no organisms. In each case the gall bladder showed chronic inflammation but no acute changes.

2 That regurgitation of duodenal content may have played a role. Such regurgitation is theoretically possible but unfortunately it can be neither proved nor disproved. In several of my patients the onset of acute symptoms occurred at the height of digestion a few hours after a heavy meal when conditions so regurgitation and for the development of pancreatitis were favorable.

3 That infection by means of lymphatic extension played no role in any of my cases. Had there been an infection in any other organ leading to such an acute condition in the pancreas there should have been symptoms of such an infection. But that was not the case. All patients were stricken suddenly while apparently in excellent health and the symptoms were at once referred to the epigastrium or at least to the upper abdomen. In none of the patients was there early temperature or rise in pulse. The blood count was high but this is frequently found in conditions not strictly inflammatory. Characteristically no acute inflammatory signs were observed in any organ at the time of operation and the cultures taken from the peritoneum and the retroperitoneal tissue as well as from the gall bladder were all negative. The tissues from the case which came to autopsy showed no acute inflammation except in the fatty tissue surrounding necrotic areas where it formed a protective barrier.

Pain is by far the most important and persistent symptom. It is at once severe and overwhelms the patient with the suddenness of its onset. It may come somewhat intermittently as

in intestinal obstruction but usually it is steady and never lets up. It is situated in the upper abdomen in most patients in the epigastrium in others more to the right or left. It frequently radiates to the back and shoulders. The pain is of such severity that the patient are unable to rest they moan and toss about and beg for relief.

Vomiting is the next most important symptom and in the more severe cases recurs every few minutes. It is distressing to see such a patient in pain retch and strain trying to bring up a small amount of fluid. Vomiting may continue very frequently for a day or more and then stop or it may continue until operation or death. In one of the patients it lasted for two weeks. The vomitus is usually yellow in color has no abnormal odor and no unusual characteristics. After vomiting ceases hiccup and retching may continue as evidence of irritation in the upper abdomen.

Collapse symptoms are frequently present they are more or less severe depending on the intensity of the attack. In the very severe cases with hemorrhage or extensive necrosis cyanosis may be present and death may occur within a few hours or days.

The physical signs depend on the stage during which a patient is seen and on the severity of the attack. Most patients now come under observation in the first few days and during this period the signs point to some acute lesion in the upper abdomen. What has struck me as most interesting is the lack of physical signs as compared with the severity of the symptoms. At the time they came under observation some of my patients had no rise in temperature and the pulse rate was not increased. The abdomen was only slightly distended and there was slight rigidity or none at all. The most marked sign was extreme tenderness over the entire upper abdomen perhaps most marked just above the umbilicus and to the left of the median line. Such extreme tenderness with only light rigidity or none at all and the lack of other signs have seemed to me to be additional evidence that we were not dealing with an inflammation due to infection but rather with a chemical irritation of the peritoneum. Other

aseptic peritoneal exudates blood from an ectopic pregnancy for instance will give similar findings

The blood count in the patients in whom it was done during the early stage showed leukocytosis with an increase in the polymorphonuclear count Icterus was present in several patients early in the disease and was therefore probably not due to pressure of the enlarged pancreas on the common bile-duct but rather to the same underlying condition which was responsible for the pancreatitis namely temporary obstruction at the papilla either in the form of a stone or spasm

The diagnosis though often doubtful is made with increasing frequency as judged by the more recent literature The history is important because most patients have had previous attacks of upper abdominal pain which may have been mild attacks of pancreatitis or been caused by the existing cholecystitis or cholelithiasis All my patients gave a history of previous attacks and while some stated they had been different than the one for which they were admitted others were under the impression that they were the same type but milder in character We do know that the cases operated upon vary a great deal in regard to severity of symptoms and extent of lesion and it is therefore not difficult to believe that some attacks may be so mild that they subside without coming to operation Acute pancreatitis is most often mistaken for cholecystitis for peritonitis from a perforated viscus or for acute intestinal obstruction and it will not always be possible to differentiate between them Bearing in mind however particularly the difference between the intensity of the symptoms and the slight distention of the abdomen slight or no rigidity and the absence of constipation should at least make one think of acute pancreatitis especially when the patient has been apparently healthy immediately before the attack has come on soon after a heavy meal Laboratory examinations are of little value The vomitus and the feces show nothing characteristic and the blood examination will at most indicate that an acute condition exists The urine may show a small amount of sugar the presence of which may make us think in the right direction

Treatment—The general opinion among surgeons today is that the disease is a surgical condition no matter during which stage it comes under observation. A study of the literature shows conclusively that operation during the early stage offers the best chance. In order to determine what we want to accomplish by an operation we must know what are the most likely causes leading to a fatal outcome. There are various opinions on this subject and it is possible that several causes work together. Some authors attribute death to shock or hemorrhage others believe it is due to the sudden throwing out of function of an important gland. The most popular theory is that it is due to poisoning of the body by decomposition products of the pancreas or a toxemia produced by fat necrosis. That the exudate in the peritoneum and retroperitoneal tissue is toxic and is chiefly responsible for the general symptoms is demonstrated by many cases in which nothing was done but to sponge out this exudate and recovery followed. To accomplish this is therefore one of the objects of the operation. It is also believed that the tension in the pancreas and peripancreatic tissue is partly responsible for necrosis of the gland. Relief of this tension during the early stage of the disease may therefore inhibit or limit the amount of necrosis. Such relief of tension can be brought about by splitting the fat overlying the pancreas or even entering the pancreatic tissue if areas of softening are present. Hemorrhage may be controlled or at least the hemorrhagic exudate may be drained instead of allowing it to spread into the retroperitoneal tissue for it is probably the pressure on or the penetration of the sympathetic ganglia by the exudate which produces shock. It is seen therefore that an early operation is able to counteract almost any of the possible cause of death.

The best approach is through a median or right rectus incision. Sponges are at once inserted to absorb exudate and prevent spreading it into the lower abdomen which is usually not involved. The exudate is then sucked or sponged out and the upper abdomen explored. I have approached the pancreas in my case through the gastrotomic incision it gave good ac-

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CALCULUS OF DUCT OF SUBMAXILLARY SALIVARY GLAND

Case I—Mr S B thirty four years of age presented himself on January 25 1928 on account of a painful swelling in the left submaxillary region. He reported having noticed a slight swelling there from time to time for several years. It had never produced severe symptoms and would always disappear spontaneously. In July 1927 the swelling suddenly reappeared become very painful and increased to such a size that he was unable to swallow. He went to a hospital where he was told that the swelling was secondary to infected tonsil and that they should be removed. A gargle was ordered. A few days later he discharged a large calculus into the mouth which he brought for inspection and which looked like a salivary calculus. It was roughly the size of a white bean and very brittle. After that he had experienced immediate relief had been able to eat and the swelling under the jaw had subsided. At the end of 1927 the swelling had reappeared and had remained sometime been smaller then again larger. Swallowing was possible but at times very painful. There was discharge of pus into the mouth from time to time. His chief complaint was pain often keeping him awake and radiating over the head and into the tongue. He was sent to me by his family physician with the diagnosis of salivary calculus which had been verified by a Koentgen ray examination (Fig 288).

The patient presented a prominent swelling the size of a large walnut distinctly localized to the region of the submaxillary gland. It was hard and very tender. The overlying skin was slightly red. No fluctuation could be made out. There was no enlargement of the surrounding lymph node. In the mouth there was no swelling visible there was no redness and no unusual tenderness. A probe could be inserted just to the left of

cess and allows of good subsequent drainage. If the pancreas does not look or feel badly diseased one may be content to insert gauze tampons into the retroperitoneal space for drainage. Usually, however, it is well to split the fat overlying it bluntly and then insert the gauze tampons directly to the pancreas. The step so far carried out have removed the free exudate have relieved the tension in the gland and by draining the retroperitoneal tissue have produced favorable conditions for carrying the toxic exudate outward instead of allowing it to spread further into the tissue. One may end the operation here or devote some attention to the associated conditions. All of my cases had gall bladder involvement. The question arises what to do with these associated lesions. My belief is that if access is good and the patient's condition warrants it one should remove the gall bladder at once. The reverse being the case it is better to postpone the gall bladder surgery to another date.

Prognosis—The prognosis depends on the amount of damage done, the intensity of the toxemia and the time at which operation is performed.

There is ample evidence that patients may recover from the acute attack without operation and develop one of the late sequelæ such as purulent abscess or necrosis. The treatment of all these conditions is surgical. I believe that if the entire pancreas is at once extensively involved there is very little hope for the patient unless drainage and relief of tension are instituted very early. If only a portion of the gland is involved the prognosis is better especially if the tail instead of the head is involved.

Once operated for pancreaticitis the patients likely to develop another attack. Theoretically one would say that if the predisposing factors continue to operate there is reason to believe that subsequent attacks may follow. It will therefore be well to pay attention to the associated gall bladder disease either at the time of operation or subsequently.

in lymph nodes were large but soft and did not require removal. A cigarette drain was inserted to the floor of the mouth and a strip of iodoform gauze was placed beneath it to serve as a protective barrier for the neck should there be leakage from the mouth. The platysma was closed with continuous plain catgut and the skin with silk.

The drains were gradually removed and the wound healed rapidly so that the patient could be discharged ten days after operation.

The pathologic examination of the gland showed extensive replacement of the glandular tissue by fibrous tissue which is rather poor in fixed connective tissue cells though infiltrated with many small round cells and plasma cells. The inflammatory cells usually occur in large aggregations about the persisting submaxillary tissue which consists chiefly of scattered ducts or collections of ducts. A few of the ducts are dilated. The transformed gland is edematous and congested and presents several small irregular foci of necrosis.

Case II—Mr. R. R., forty-one years old, complained of a recurring swelling in the left submaxillary region. He had had trouble about ten years. An attack would come about once a year usually in the winter. It would come on suddenly, the swelling would develop rapidly, become very painful and he would be unable to swallow. It was always associated with fever up to 103° F. He said he would get deathly sick with it. Each attack would last about two weeks. After the first few days of increasing symptoms his breath would become bad and pus appeared in the mouth. Then the symptoms would gradually subside. He had had an attack about four months previously and another a month ago from which he had not completely recovered. Yawning was painful and he always had the feeling that there was something wrong in the floor of the mouth.

The general appearance was that of a healthy man and physical examination was negative except for the local finding. His mouth was clean and well cared for, the teeth were in good condition. There was no pus exuding from any excretory duct.

there was no discharge of blood or pus. On account of the long involvement of the gland in the suppurative process and the deep situation of the calculus operation with extirpation of the gland was decided on.

A 3 inch incision was made under the left lower jaw far enough down to avoid the branch of the facial nerve to the angle of the



Fig. 288.—C. I. I. f. d. f. b. m. a. l. l. r. y. s. a. l. a. r. y. g. l. a. n. d.

mouth. The platysma was incised and the gland exposed. It felt hard and nodular. It was carefully dissected free until the duct was isolated. At this point there was considerable infiltration of the tissue and the duct was very much enlarged and formed an abscess cavity containing a calculus. A division was made close to the mucous membrane of the mouth and the entire mass extirpated. The facial vessels had to be ligated. The surrounding

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The general appearance was that of a healthy man and physical examination was negative except for the local finding. His mouth was clean and well cared for, the teeth were in good condition. There was no pus exuding from any excretory duct.

Externally there was no swelling visible. On bimanual palpation the left submaxillary gland was felt to be enlarged, hard and nodular. A stone was not palpable but was demonstrated by a Roentgen ray examination.

The operation was performed under local anesthesia and the gland and duct were completely extirpated. A large calculus was found to completely block the duct. The wound healed kindly and the patient was discharged one week after operation.

The pathologic examination showed chronically inflamed submaxillary gland with an irregular fibrosis, marked fatty infiltration and a rather diffuse inflammatory cell infiltration chiefly with small round cells.

Case III—Miss S. S., fifty-two years old, came under observation on account of a painful swelling under the left lower jaw which had been very acute for a week and was getting worse. She suffered severe pain in the swelling and drawing pain in the ear, jaw and entire side of the face. The tongue also hurt her. She stated that she had had pain from time to time for years but it was always limited to the floor of the mouth and was never as severe as present. She now had a distinct swelling which seemed localized to the submaxillary gland. It was very tender to touch and the overlying skin was infiltrated and somewhat reddened. There was also tenderness and infiltration in the floor of the mouth. No fluctuation could be made out and a stone could not be felt. A diagnosis of calculus was made on the symptoms and findings and operation was done with the extirpation of the gland. While dividing the duct a rough stone the size of a large pea fell out. It had been embedded close to the exit of the duct from the gland. Complete relief followed.

Case IV—Miss B. B., twenty-one years old, had had trouble with a painful swelling under the left lower jaw for about two years at the time she first came under observation. The swelling appeared from time to time and after the discharge of a moderate amount of pus to the mouth it would subside.

She presented a tense slightly tender swelling of the left submaxillary gland. There was no redness of the skin and no fluctuation. The floor of the mouth on the left side was raised and reddened. A calculus was suspected but could not be felt. An x ray was ordered but the patient failed to carry out instructions and did not return.

A few months later she again appeared. The swelling had almost subsided. A stone could be felt in the floor of the mouth just beneath the mucous membrane. A small incision was made directly over it and it was easily extracted. Complete relief of symptoms followed.

The 4 cases are examples of a condition which is not at all uncommon and which yields excellent results when recognized and properly treated. Calculi may appear in any of the salivary glands or their ducts but are most common in the submaxillary. It is interesting that in these 4 cases it was the left gland which was involved. They may be single or multiple and after the discharge of one or more stones others may form.

The chief symptoms are pain and swelling perhaps associated with the discharge of pus from the duct. Pain may be limited to the swollen gland or to the site of the impacted stone with its surrounding inflammatory infiltration but often there is also radiation into the tongue the jaw or the entire side of the face. It is frequently very severe and incapacitates the patient much more severe than the usual acute lymphadenitis. Difficulty in swallowing is present when the gland becomes swollen or the floor of the mouth is infiltrated. Fever is present in the more acute cases.

The diagnosis is easy if one bears the condition in mind. A recurrent painful swelling in the submaxillary region associated with the discharge of pus into the mouth should always make one think of a salivary calculus. The swelling is very prominent and is strictly limited to the outline of the submaxillary gland. There is usually no diffuse swelling with edema such as one gets in acute suppurative lymphadenitis. The severity of the pain should attract attention. Probing the excretory duct may reveal the presence of a stone or one may feel it under the mucous

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CLINIC OF DR. RICHARD LEWISOMAN

MT. SINAI HOSPITAL

REACTIVATION OF AN OLD DUODENAL ULCER FOLLOWING DISCONNECTION OF A GASTRO ENTEROSTOMY

THE patient A. S. is a man thirty three years old who was first admitted to Mt. Sinai Hospital July 23, 1923 and was discharged September 7, 1923. The diagnosis was gastrojejunal ulcer. The operation consisted of excision of the ulcer and disconnection of the gastro enterostomy.

Past History—The patient had been ill with stomach trouble for the past ten years. He was operated upon ten years ago at a hospital in Boston for duodenal ulcer. A gastro enterostomy was performed. He felt perfectly well for two years after the operation when he had a recurrence of symptoms and was re-operated at another hospital—an appendectomy was performed. This operation did not relieve his symptoms. Two months after the appendectomy he went to another hospital where he was treated medically for epigastric distress.

During the following year he was again hospitalized for two weeks for abdominal pain and was discharged without relief of symptoms. He re-entered the same hospital two years later and was treated medically once more with only slight relief. Three years ago he went to a hospital in New York where he stayed for four months his symptoms being relieved. He felt very well up to nine months ago when he was seized again with marked abdominal cramps. His pains were very severe at times mainly on the left side from the epigastrium down to the suprapubic region. He had vomited only occasionally but had no hematemesis and had had no blood in the stool.

Physical examination revealed a gastrojejunal ulcer. On July 24th I performed a laparotomy and reconnected the

membrane of the floor of the mouth. A Roentgen ray examination may give the desired information if other means have failed. The condition must be differentiated from chronic lymphadenitis, chronic inflammation of the salivary gland without stone and tumors of the gland. The former usually presents no difficulty, but it is sometimes impossible to differentiate between chronic inflammation and tumors because the elements are also frequently quite painful.

The treatment depends on existing condition. If a stone can be felt in the floor of the mouth and seems easily accessible it may be extracted or one may incise directly over it and thus deliver it. If the stone is situated more deeply at the exit of the duct from the gland and the latter has undergone pathologic changes as the result of repeated stagnation with infection it is better to extirpate it completely together with its duct. The results are entirely satisfactory.

x Ray Report—Examination of the gastro intestinal tract does not show any evidence of a stoma. The stomach was situated somewhat obliquely its tone was good peristalsis exaggerated and irregular. The duodenal bulb was indefinite fluoroscopically and on plates. Motility of the stomach was delayed at observations made three and six hours after meals a moderate residue was still present in the stomach. These observations would indicate the presence of a duodenal ulcer.

A stomach tube was passed and yielded 2 quarts of fluid.

Diagnosis—Recurrent duodenal ulcer with obstruction.

Operation—December 12 1923 partial gastrectomy (Finsterer operation (Resektion zur Ausschaltung) and Hofmeister anastomosis for penetrating ulcer of the duodenum with pyloric obstruction) gas and ether. Excision of the old abdominal scar.

Findings—The patient had a large ventral hernia the stomach was large and atonic. In the second portion of the duodenum one could feel a chronic ulcer penetrating into the head of the pancreas with very marked inflammatory reaction around it causing pyloric obstruction. Furthermore there were numerous adhesions between the stomach and the liver and between the liver and the abdominal wall.

Procedure—The adhesions between the liver and the abdominal wall were freed so that the stomach could be properly mobilized. The gastric artery was ligated. The jejunum appeared normal. No trace of the jejunal suture performed five months previously could be seen. The vessels of the gastro-colic omentum were divided between clamp after the left gastro-epiploic artery had been ligated. The pyloric artery and the right gastro-epiploic artery were then ligated.

The stomach was cut across and the individual vessels were ligated. The lateral dissection was carried through the first part of the duodenum just beyond the pylorus and the duodenum was closed in three layers. The connection between the stomach and the jejunum (Billroth II) was executed according to Hofmeister. A small rubber drain was inserted into the subhepatic space and the abdominal wall was closed in two layers. Two days after operation a small duodenal leak devel-

the previous median incision. No adhesions were found between the abdominal wall and intraperitoneal organs. The stomach was large. The adhesions between the pylorus and the gall bladder were divided. A small scar was seen just beyond the pylorus (evidence of healed ulcer) and a few calcified glands in the neighborhood of the pylorus. The pylorus was patent and easily admitted one finger.

The duodenum appeared perfectly soft on bimanual palpation. The gastroenterostomy tomo was markedly tenosed, the opening hardly admitting a lead pencil. A marked induration extended into the transverse mesocolon. The transverse colon was densely adherent to the stomach and was carefully liberated. The stomach was then entered and the ulcer was excised. *The ulcer was a marginal ulcer without a crater.*

In view of the fact that there was no evidence of an active ulcer in the duodenum, the gastroenterostomy was completely disconnected and the openings in the stomach and jejunum were closed in two layers, the jejunal opening being closed in the transverse direction. The abdominal wall was closed in two layers after the insertion of a small drainage tube.

The patient had a rather stormy postoperative course. He developed a pneumonia with a lung abscess. Under expectant treatment this lung abscess, which was clearly seen on repeated x-rays, gradually subsided. He became afebrile on the twenty-sixth day. The wound healed by primary union, the drainage tube being removed on the fifth day postoperation. He left the hospital September 7th in good condition.

For two months after his discharge he was well, but during the last month before his readmission he had a recurrence of symptoms which became very intense during the last week. He suffered severe pains which were relieved to a certain degree by vomiting. During the last few days he suffered agniasis. In fact, I have rarely seen any gastric case suffer as severely as this man. He was crawling on the floor crying loudly and it was evident that he needed immediate relief.

He was readmitted to Mt. Sinai Hospital December 9, 1923 and discharged December 31, 1923.

Furthermore although I am not a believer in gastroenterostomy and have stated so repeatedly in previous publication there may be some interrelationship between the gastroenterostomy and the duodenal ulcer in a rare group of cases. It is possible to assume that in this group the gastroenterostomy keeps the duodenal ulcer under control and that when we disconnect the gastroenterostomy we induce a reactivation of the old ulcer. For this reason disconnection of the gastroenterostomy stoma even in apparently healed cases of duodenal ulcer should not be a method of choice.

I would like to say a few words about the Finsterer operation (Resektion zur Ausschaltung). As you know Haberer introduced partial and subtotal gastrectomy for duodenal ulcer in 1920. While in the majority of instances the radical removal of a duodenal ulcer is a fairly easy procedure we may encounter cases where the ulcer is so deeply situated and encroaches so closely upon the common duct that removal of this ulcer with the distal half of the stomach may not be without serious danger to the life of the patient. For this group of cases Finsterer has introduced his operation which leaves the ulcer *in situ* and resects the stomach just above the ulcer-bearing area, the dissection being carried through the first part of the duodenum just above the ulcer. It is certainly an open question whether for very deep ulcers the Finsterer operation is preferable to a simple gastric enterostomy.

The advantages of the Finsterer operation as compared to gastroenterostomy are twofold. First it completely sidetracks the flow of the hyperacid gastric juice whereas gastroenterostomy fails to perform a complete sidetracking in the majority of instances. Second the Finsterer operation in the same way as a subtotal gastrectomy with removal of the ulcer establishes a postoperative achylia in the majority of cases when the dissection is carried beyond the pylorus. The postoperative achylia seems to be a most important factor in the prevention of recurrent ulcer. We know that gastroenterostomy fails to change the postoperative hyperacidity in the vast majority of cases.

oped which healed in about a week and did not give the patient any discomfort aside from a slight erosion of the skin. The patient made a perfect recovery.

December 30, 1923 upon discharge the Iwald test meal showed free acid 32 total acidity 50.

This patient has been perfectly well ever since the last operation during an observation time of over four years. His gastric symptoms have entirely disappeared and he has gained weight. He was seen last only a few months ago.

Comment—This case offers different points of interest. At the time of my first operation on this patient July 24, 1923 I examined the duodenum very carefully by bimanual palpation having introduced the finger through the opening in the stomach at the site of the old stoma way down into the duodenum. I feel absolutely certain that no active ulcer existed at that time. The findings just described induced me to disconnect the gastroenterostomy after I had excised the gastrojejunal ulcer.

Very soon after the procedure the old ulcer began to give severe symptoms. The inflammatory process in the duodenum became active again and a large ulcer of the penetrating type reformed in the duodenum causing a marked stenosis at the pylorus.

It is often claimed that the disconnection of a gastroenterostomy is absolutely harmless when there are no pathologic findings in the duodenum at the time of reoperation. It seems to be the method of choice in many clinics to disconnect gastroenterostomies with or without gastrojejunal ulcers when evidence of pathology in the duodenum is absent. That the procedure is not without danger is demonstrated by this case.

We know very little about the life cycle of ulcers. It is very possible that duodenal ulcers flare up and subside at an interval in just the same way as gastric ulcers (Cohn's life cycle). Thus when we re-operate such a patient at the intermittent period we may be liable to believe both by inspection and careful palpation that the ulcerative process in the duodenum has been completely arrested.

DESTRUCTION OF A MURPHY BUTTON RETAINED IN THE STOMACH FOR SEVEN YEARS

This patient was first admitted to Mt Sinai Hospital on May 14 1917 at which time he was sixty years old

He had complained of epigastric pain with occasional nausea for the last six years His symptoms had become aggravated for the last three months He had pains one hour after his meal and vomited about twice a week He had severe heart burn and sour eructations and had lost a great deal of weight

His physical examination was negative except for some right epigastric tenderness His prostate was enlarged The x ray showed that the duodenal bulb was normal The motility of the stomach was markedly decreased a considerable residue being present after six hours

Diagnosis - Pyloric obstruction

Iwald test meal showed free acid 78 total acidity 109

On May 19 1917 I operated this patient under gas and ether through a median epigastric incision The stomach was markedly dilated and hypertrophied A large crater ulcer was found at the pylorus encroaching upon the anterior and posterior wall of the stomach and densely adherent to the pancreas A partial gastrectomy was not deemed advisable I could not state definitely from the palpation whether the ulcer was benign or malignant in nature I felt that if the ulcer were inoperable it was inoperable on account of the dense fibrous and infiltrative changes in the pancreas On the other hand if we were dealing with a benign indurated ulcer a simple enterotomy might possibly cure this condition and relieve the obstruction

An trocolic gastrotomy was performed and a Murphy button (Weir modification) used The patient made an uneventful recovery but the button was never removed

However I would not like to be misunderstood. The ideal operation is undoubtedly subtotal gastrectomy with a removal of the ulcer bearing area. However in a small group of cases the procedure of Finsterer may have its place. I have used this procedure in 3 cases only. One died two days after the operation probably from myocardiac failure. I have followed the other 2 cases carefully among them the one just described and they have been perfectly well up to the present time.

This patient was incapacitated more or less for ten years of his life following the gastroenterostomy operation for duodenal ulcer. If a subtotal gastrectomy had been performed at the time of the primary operation he would have been spared two subsequent operations and hospitalization over a long period in an attempt to cure his disease medically.

The patient made an uneventful recovery and left the hospital on October 1 1924. An x ray the day before his discharge from the hospital failed to show any evidence of remaining parts of the button in the region of the stomach.

This patient was re admitted to the hospital on June 15 1925 for urinary retention. He had been free from any gastric symptoms since his last operation.

You will have noticed that upon his first admission his prostate was somewhat enlarged. This prostatic enlargement had given him symptoms since his last discharge from the hospital and he had a residual urine of 6 ounces. His phenol sulphonephthalein test was 5 per cent. A few days later he left the hospital against advice. On July 7th he returned in marked uremia with very high blood figures. His urea nitrogen was 114 incoagulable nitrogen 178 uric acid 7 creatinin 5 CO 17. He died five days later in uremia July 12 1925. No postmortem was obtained.

Comment—I have presented this case to you because in my experience and in the experience of others destruction of a Murphy button is a very rare occurrence. Murphy buttons as you know sometime drop back into the stomach instead of passing down into the intestine. These buttons when they lie free in the stomach do not cause any symptoms and are often carried by the patient for many years. I know of a case where a button was thus carried in the stomach for over twelve years without symptom and without any destruction of the button.

The button used for this patient was made by one of the best and most experienced instrument makers in New York. The manufacturer told me they had never heard of a similar case in spite of the fact that they had sold a very large number of buttons during the last twenty years.

A clue from the fact that the button was partially destroyed *in situ* in this case is of other interest. First the button was lodged tightly in the first part of the duodenum for some time without causing any ulcerative process in the duodenum. Furthermore the wires of the button after its partial destruction

On September 1 1924 the patient was re admitted with the following history. He had felt greatly relieved for four to five years following the operation. After that he had a sticking pain in the epigastrium.

An x ray taken September 25th showed the Murphy button caught in the first part of the duodenum just beyond the pylorus.

On September 10 1924 under local anesthesia and through the incision previously described I performed a gastrotomy for retained Murphy button. The gastro-enterotomy was almost obliterated hardly admitting the tip of the finger. There was no sign of an ulcer at the site of the stoma. The stoma was perfectly soft. The stomach was markedly dilated. The

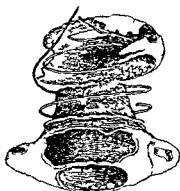


Fig. 89 — Dissection of Murphy button

Murphy button was found just beyond the pylorus in the first part of the duodenum. The button was pushed back through the pylorus into the stomach and was removed by gastrotomy. The pylorus was wide open and easily admitted two fingers. The gastrotomy opening was closed in three layers. Layer suture of the abdominal wall.

The button was very much eroded. It had partly opened. Some of the metal surface was eaten away leaving the wire part of the button plainly visible and protruding. The button was very brittle so that the slightest pressure caused further rupture of the structure.

CLINIC OF DR. EDMONDE D. NFER

MANHATTAN EYE, EAR AND THROAT HOSPITAL

CHOLESTEATOMATA

BECAUSE of the confusion of opinion that arise when this term is used it has seemed worth while to review this subject and possibly give better understanding to this much misconstructed term. Its significance in otology is somewhat different from that in neurology. Most authors on pathology explain a similarity in genesis but do not make sufficient differentiation in the disease processes between brain and cord cholesteatomata and those of the middle ear and sinuses. The symptoms and general conduct of the otic and neurologic cholesteatomata are very different.

The name cholesteatomata was introduced into the literature by Mueller in 1838 and was used to signify a tumor of epithelial cells impregnated with cholesterol crystals. Cushing states that cholesteatomata are related to otitis media lesions and are not uncommon. They are generally regarded by writers as something apart from the true cholesteatomata or pearly tumor within the cranium. However, he believes this view may be erroneous. Cholesteatomata remote from the temporal bone are unusual tumors and certain types of them exist elsewhere.

One of the very important and distinguishing features of ear and intracranial cholesteatomata is that they originate with infection and most of them harbor infection throughout their existence. Therefore their dangerous character and their resultant fatal intracranial complication.

On the other hand intracranial cholesteatomata do not arise as the result of infection never display any of the manifestations

protruded into the lumen of the duodenum and were lodged in the mucosa. Yet no perforation occurred.

Moreover it may be of interest to point out that a large pyloric ulcer with obstruction healed completely following a simple gastro-enterotomy. We know that obstructing ulcers yield better to a gastro-enterostomy than the non-obstructive form. There are undoubtedly some cases which are influenced beneficially by a gastro-enterostomy. However it is practically impossible to foretell at the time of the operation whether a simple gastro-enterotomy will influence an ulcer at or near the pylorus to any extent. For this reason during the last five years in this clinic we have substituted the more radical procedure of subtotal gastrectomy for a simple side-track anastomosis operation (gastro-enterotomy).

I would like to say a few words about the use of the button in gastric surgery. The Murphy button was certainly a most valuable instrument in the development of gastric surgery. In fact I have heard one of our leading surgeons state that the Murphy button was the most important surgical instrument ever invented. In the early stages of gastric surgery the button helped to simplify and shorten the operation. It was used widely. In fact in our Clinic up to about ten years ago the Murphy button was used in practically every case of partial or subtotal gastrectomy. With the recent development of technique in gastric surgery the button has been abolished gradually and suture anastomosis is used extensively. In the vast majority of cases a suture anastomosis can be carried through without any difficulty. However in the cases of large gastric ulcers or ulcers situated very near the cardia where up to four-fifths of the stomach may have to be removed anastomosis by button is much safer and simpler than anastomosis by suture. While the case may be rare they will present themselves occasionally to any gastric surgeon. Some clinics have discarded the Murphy button entirely. I certainly think that the button still has its place in a selected group of cases and that it should not be discarded from the armamentarium of the surgeon.

the term. They are not analogous tumors either in respect to their tissue of origin or their general content. He further states that he does not consider the so called middle ear cholesteatomata in his group (intracranial cholesteatomata) since it is still a moot question as to whether they are originally meningeal growths which have broken down and made their way to the surface or whether they result simply from collections of the products of inflammation due to the chronic otitis media. Crone has reported 6 cases of dermoid fistula of the temporal bone that true intracranial cholesteatoma may occasionally occur in this situation is probably true.

The above views show quite a diversity of opinion regarding the etiology and classification of cholesteatomata.

Cushing states that the common situations of the so called cholesteatomata are (1) in and about the temporal bone (2) free in the leptomeninges of the cerebral base (3) in the cerebral ventricles these last being endothelial tumors. He further states that in still another situation typical cholesteatomata may occur namely in the bones of the skull at places remote from the middle ear. Under these circumstances as is also true of the tumors encountered by the aurist in the temporal bone the gluing surface of the growth is obscured by its environment. These growths judging from the few cases which have been reported appear to be of the epidermoid variety alone. They seem to originate between the two tables of the skull the inner table being the first to become ballooned out and absorbed as the growth enlarges. Such a rare case was reported by him (Dr Harvey Cushing) in 1927. This tumor was very infectious in development and at the time of removal with complete recovery was the first of a series of it had none of the symptoms of otic cholesteatomata especially the inflammatory.

In otic cholesteatomata there is a definite otitic process which takes place in advance of the formation of the otic cholesteatoma. This is a very infectious process and it is this that nature attempts to cure through the cholesteatomata. The initial step in this pathological process is infectious destruction of mucous membrane and then follows the pathologic process of necro-

of infection and inflammation and show none of the suddenly dangerous or fatal symptoms of ear cholesteatomata. Brain cholesteatomata seem to arise from cell inclusion and appear to comply with the tumor theory of embryonic cell inclusion. The symptoms are not inflammatory but those of intracranial neoplasms. There is no unity of opinion regarding the etiology of brain cholesteatomata. It is known they have their attachment in the meninges. Horrax in 1922 reported a series of 150 verified brain tumors in which there were only 1 case of true intracranial cholesteatomata. This rare type of intracranial cholesteatomata is subdivided into two classes viz (1) The pearly tumors (2) the hair containing. These terms are not definite and have not been clearly used as pearly tumors have been reported which contained hair. The term pearly tumor according to Horrax is usually applied to the non hair containing group meaning that these tumors exhibit a definite pearly luster owing to the highly refractile quality of their coating. The favorite situations of these two classes of intracranial cholesteatomata are very similar their most frequent sites being somewhere near the midline at the base of the brain or in the region of the fourth ventricle though the hair containing have a strong predilection to push into the cerebral hemispheres where they are usually much larger than the pearly variety. The cerebellopontile angle is one of the most common places for the pearly tumor whereas no hair containing have been reported in this location.

Ewing describes cholesteatomata as tumor composed of lamellated wavy or scaly material enclosed in a wall of stratified squamous cells. They arise from embryonal epidermal inclusions. They occur in all parts of the brain. Some pathologists believe that most cholesteatomata of the brain arise from an inclusion of the pharyngeal wall connected with the hypopharynx.

Again quoting Horrax he states that tumors of the hypopharynx arise from the remains of Rathke's pouch sometimes reported as intracranial cholesteatomata because they contain cholesterol crystals should not be included in this use of

the term. They are not analogous tumors either in respect to their tissue of origin or their general content. He further states that he does not consider the so called middle ear cholesteatomata in his group (intracranial cholesteatomata) since it is still a moot question as to whether they are originally meningeal growths which have broken down and made their way to the surface or whether they result simply from collections of the products of inflammation due to the chronic otitis media. Crone has reported 6 cases of dermoid fistula of the temporal bone that true intracranial cholesteatoma may occasionally occur in this situation is probably true.

The above views show quite a diversity of opinion regarding the etiology and classification of cholesteatomata.

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In relation to cholesteatomata there is a definite otitic process which is the cause of the formation of the otic cholesteatoma this is a very infectious process and it is this that nature attempts to cure through the cholesteatomata. The initial step in this dual process is infection destruction of mucous membrane and in this the pathologic process of necro-

and cavitation is followed up by nature with an attempt at limiting or healing by throwing into the cavity a profusion of epithelial cell. Otic cholesteatoma is not a tumor it is more an exaggerated effort on the part of nature at self healing resulting in an overproduction and accumulation of epithelial cell which eventually undergo decomposition. The two stage process is (1) insidious bone destruction cavitation (2) the excessive proliferation and accumulation of epithelial cell in an effort to heal or line the cavity.

Occasional cases have been observed where nature succeeded in her effort where the excess of cells has been removed by the aurist and the cavity found effectively lined with epithelium. These cases are excessively rare and by no means establish a standard that is at all safe to follow. Cholesteatomata of the middle ear and mastoid are best treated by radical mastoidectomy.

In 1970 J. M. Smith writing on cholesteatomata of the middle ear and mastoid quoted Wingrave who classified cholesteatomata as (1) encapsulated (2) non encapsulated.

(1) The encapsulated displays a sac in the bony cavity lined by a single layer of columnar epithelium this in turn rests on a thin fibrovascular endosteum. The sac itself consists of a somewhat thickened fibrovascular sheath made up of variously shaped epithelial cells columnar spheroidal and polyhedral with cholesterol granules in the layer. The sac contents consist of closely packed or laminated squamous cells either devoid of nuclei or showing their faint outline. The cells have undergone some metaplastic processes.

(2) The non encapsulated type shows an irregular arrangement of granulation tissue lymphocytes and leukocyte blood pus and bacteria of all kind small sequestra and picules of bones squamous cells in loose or laminated arrangement. The microscopic finding in material removed shows that the normal epithelium is replaced by squamous cells in old case. The metaplastic process often extends to the mastoid process sometimes showing wide invasion. The process may be attended with a discharge of very foul odor.

The symptoms of the cholesteatoma may be entirely absent until the signs of intracranial involvement appear. The middle ear may be dry or in rare cases the drum may be intact. The dry cases are usually the encapsulated type. There is usually a history of remote ear discharge.

In the non encapsulated there is usually profuse discharge of foul odor with a history of long duration—three to ten years or longer.

Diagnosis—This often cannot be made until at operation or until the appearance of intracranial complication. Rare cases have been reported where the drum was intact and yet cholesteatoma present in the middle ear and mastoid. In some cases a positive diagnosis can be made from the material removed. The x-ray occasionally reveals the presence of cholesterol. A profuse foul discharge of long duration should be regarded as suggestive of cholesteatoma. Some cases of the encapsulated type though apparently sterile proceed with wide destruction of bone and soft part resulting in fatal intracranial involvement. The non encapsulated usually show some manifestations of periodic or persistent headache before a fatal complication is attained. Otologists regard cholesteatoma as a dangerous process. A full diagnosis often can only be made by exploratory operation.

Treatment Radical mastoidectomy is the logical safe handling of cholesteatoma of the middle ear and mastoid. It is not only necessary to make a careful thorough removal of all diseased tissue but it is important to follow up the cases with pain taking after care and keep these patients regularly under observation for a long time annually. Neglect in these cases permit of recurrence. Cleanliness and a ration of the cavity are essential to success in these cases. This leads me to believe that the anatomical condition of these cavities is a factor in the production of cholesteatoma.

Prognosis is good if operated before intracranial complication arise. Otologists agree that early operating before wide destruction of bone has taken place is manifestly safer and more assuring of permanent cure than in late advanced case. When

thorough radical mastoidectomy is performed the results are good

The tympanic and mastoid cavities if diseased over a long duration of time are usually invaded by cholesteatomata. The extent of this insidious osteitic process can in no way be estimated prior to operation; only the operation reveals the amount of disease.

Conclusions —I Ear and sinus cholesteatomata result from a dual process viz (1) Infection and destruction of tissue followed by (2) excessive proliferation of epithelial cells within the diseased cavity.

II Ear cholesteatomata do *not* appear to conform to the tumor theory of embryonic cell inclusion; they are attended with infection and dangerous, often fatal, complications.

III Intracranial cholesteatomata *do* appear to comply with the tumor theory of embryonic cell inclusion; they have none of the characteristics of infection or inflammation.

IV It is obvious that the pathologic processes in brain or ear cholesteatomata are in some respects very different. The present confusion will doubtless continue until a new terminology is applied which will be more descriptive.

CLINIC OF DR OTTO CARL PICKHARDT

LENOX HILL HOSPITAL

RIB NECROSIS APPEARING NINE YEARS AFTER EMPYEMA WITH RESECTION

THE patient is a female housewife fifty year of age residing in this country since 1902. At the age of fifteen until then a healthy child a curvature of the thoracic spine was noted the etiology of which is unknown. This curvature increased until she was twenty years and then ceased developing. In July 1912 she had a cholecystectomy performed following which she developed a pneumonia and then an empyema on the left side. This was operated upon and several ribs were resected. She had a stormy convalescence and blood transfusion was necessary. A sinus persisted for many months in the thoracotomy wound. The wound remained healed until six weeks prior to September 13 1927 when she was first seen by me.

At this time she stated that a small abscess had appeared in the chest and had since been constantly discharging. We were able to introduce a probe about 1 inch and a necrotic bone could be felt. Examination of the chest revealed considerable left lateral curvature. The lung sound was normal. An x-ray showed the sixth seventh and eighth ribs to have been fused at the site of the 11th rib resection. A large bony ring had formed at the site of the drainage. The inflammatory involvement of the ribs was evidently at the site of fusion near the vertebra (Fig. 200). Operation was advised and the patient entered Lenox Hill Hospital September 16 1927.

Operation September 16 1927. Under novocain infiltration and injection the 11th rib 5 inches in length was excised. A probe was inserted into the sinus and this was carefully followed

by incising the roof of the sinus to the end. A surprising amount of old fatty granulation tissue was discovered in the rounded out area the size of a 50-cent piece created by the formation of new bone. This new bone was very dense and in places small pieces had loosened. These were thoroughly curetted out. Because the sinus extended 2 inches beyond in an anterior direction the roof of this area was also laid open requiring a 2 inch longer incision. The pleura was found to be quite thick and the lung could not be seen beneath it. There was no evident perforation of the pleura. After the wound was cleaned it



Fig. 290.—Showing bone fragment with pleural deposit.

was thoroughly filled and washed out with iodoform-ether solution and then packed with iodoform gauze strips from the bottom to the surface. No suture were inserted. Dry dressing.

Pathologic Report September 21, 1921. Dactyloscopic inflammatory tissue from cavity. The specimen consisted of a small piece of tissue 2 x 1 x 1 cm. detached wall of sinus tract from empyema cavity. Microscopic examination of sections of the tissue fragment revealed dense fibrous or cicatricial tissue which in places was fully cellular. The tissue showed a focal or more diffuse infiltration of small round cell and plasma

cells and in one area there was a small localized collection of polymorphonuclear leukocytes and an occasional multinucleated giant cell. One of the fragments was apparently the wall of a cavity or sinus being covered on one surface with edematous granulation tissue infiltrated with inflammatory cells. Attached to this tissue were strands of hyaline material probably of a fibrinous nature. There was no evidence of tuberculosis.

Pathologic Report September 22, 1927. **Diagnosis** suppurating granulation tissue. The specimen consisted of some pieces of tissue designated as curetting from vicinity of empyema cavity. Sections of the fragment showed them to consist of edematous granulation tissue diffusely infiltrated with many inflammatory cells. There were many hemorrhages throughout the tissue and in places there were necrotic and suppurating areas. There was no evidence of tuberculosis.

Bacteriologic Examination—Revealed *Staphylococcus albus* and *S. aureus*.

Postoperative Course—Patient ran a moderate temperature for one week following which the temperature dropped to normal and remained there. There was always a large amount of purulent discharge from the wound and the cavity was thoroughly packed so as to prevent superficial healing. The patient left the hospital on the 20th with the wound still open. The tuberculous course was a very long drawn out affair. The wound gradually closed except for a small area 1 to 2 cm in size which reached down to the thickened parietal pleura and was surrounded by unhealthy bone. Several times during the course of the next few months some curetting was necessary although it would never become covered with healthy granulation tissue even after all the dead bone had been removed. The superficial portion of the wound tried hard to close but was not allowed to because of the possibility of the formation of an abscess. Finally on May 26, 1928, nine months after the operation the wound healed from the bottom. An x-ray taken at this time showed the condition as in Fig. 291, the bone now appearing healthy without fuzzy edge and with no infiltration of the lung tissue.

by incising the roof of the sinus to the end. A surprising amount of old fatty granulation tissue was discovered in the rounded out area the size of a 50 cent piece created by the formation of new bone. This new bone was very dense and in places small spicules had loosened. These were thoroughly curetted out. Because the sinus extended 2 inches beyond in an anterior direction the roof of this area was also laid open requiring a 7 inch lower incision. The pleura was found to be quite thick and the lung could not be seen beneath it. There was no evident perforation of the pleura. After the wound was cleaned it



Fig. 90—Showing multigranular pleural deposit

was thoroughly tiled and washed out with iodoform-ether solution and then packed with iodoform gauze strip from the bottom to the surface. No sutures were inserted. Dry dressing.

Pathologic Report September 21, 1927, Diagnosis: Chronic inflammatory tissue from cavity. The specimen consisted of a small piece of tissue 2 x 1 x 1 cm. designated wall of sinus tract from empyema cavity. Microscopic examination of sections of the tissue fragments revealed dense fibrous or scar tissue which in places was fairly cellular. The tissue showed a focal or more diffuse infiltration of small round cells and plasma

Comments—The lessons to be learned from this case are varied. First it shows how long after an apparent healing bone necrosis may appear in this instance nine years. Secondly it shows the difficulty of removing all necrotic bone tissue at one operative procedure and thirdly the difficulty of growing healthy granulation tissue on parietal pleura. Next it shows the



Fig. 293. Same as Fig. 22. k. h. l. g. k. g. l. h. ppe. mal.

involvement of all wing and to close superficially and the difficulty of maintaining it open. Finally a small rib retractor has been placed in the case by the use of a small rib retractor. This is all due to a greatly thickened pleura and the impression of the rib cage by the marked lateral curvature of the spine. It is particularly true in this type of case that long continuous attention to detail is necessary for a result.



Fig 291—Roe g gram k th same t m Fig 290 h g ma led
l t l cu atu f th p



Fig 22—Eght m h l h g d se f bo y g h b
edg mooth

Comments—The lessons to be learned from this case are varied. First it shows how long after an apparent healing bone necrosis may appear in this instance nine years. Secondly it shows the difficulty of removing all necrotic bone tissue at one operative procedure and thirdly the difficulty of growing healthy granulation tissue on parietal pleura. Next it shows the



Fig. 291. Section of rib showing the large area of necrosis and granulation tissue.

inadequacy of allowing a wound to close superficially and the difficulties attendant upon keeping it open. Finally, a consideration must have been played in this case by the loss of expansion in the chest wall due to a greatly thickened pleura and also to the compression of the rib caused by the marked lateral curvature of the spine. It is particularly true in this type of case that long continuous attention to detail is necessary to produce a result.

SARCOMA OF THE CHEST WALL

THE patient C H a male white was nine months of age at the time of his admission to Lenox Hill Hospital November 23 1926 He was discharged December 1 1926 His birth and past history are irrelevant

One and a half months prior to admission a small lump was noted in the region of the patient's right breast This had been increasing in size and at the time of examination was as large as a walnut It had never been red or inflamed and had apparently caused no discomfort Physical examination of the child showed no abnormalities except the surgical condition which revealed at the costochondral junction of the right sixth and seventh rib a semisolid cartilaginous feeling tumor the size of a walnut with a blunt base and a pointed nipple like apex directly under the skin The tumor was fixed to the chest wall with the skin freely movable over it It arose apparently from the cartilage The roentgenographic diagnosis was

(1) Chondroma

(2) Sarcoma

Excision was advised

Under drop ether anesthesia a 3 inch vertical incision was made at the right border of the sternum from the fourth to the seventh rib region and deepened to the tumor A conical hemispherical tumor with the apex up was found It had a broad base which was attached to the rib or costal cartilage as expected but had a small round very vascular pedicle extending up through the small base between the sixth and seventh costal cartilages adjacent to the sternum The tumor was apparently encapsulated and quite firm but not cartilaginous It gave the impression of being either a fibroma or a fibrosarcoma It was fully excised and the wound closed with a small gut rubber tube introduced

The postoperative course was uneventful the wound healed by primary union. The child left the hospital at the end of one week.

Pathologic Report—Gross appearance. A tumor measuring 1.6 cm x 1.2 cm. Somewhat irregular in shape and covered by a small amount of soft tissue. The consistency was firm and the mass cut with some resistance. The cut surface was whitish in color.

Microscopic Examination—Sections obtained from several parts of the tumor showed the bulk of the growth to consist of slightly fusiform cells which were generally disposed in compact bundles showing interlacings and sometimes whorl formations. The cells showed little variation in size although they stained with different intensity with hematoxylin some taking a light stain while others were hypochromatic. Mitotic figures were observed though not abundantly. The matrix was generally scanty and of a fibrillar or granular nature. It was fairly well vascularized the vessel being largely dilated endothelial lined channels. The tumor showed areas of liquefaction and localized mucoid degeneration. A part of the surface was enclosed in a fibrous capsule. In places however the tumor had broken through the capsule and had penetrated deep into the muscular tissue of the chest wall. *Diagnosis* Infiltrating fibrosarcoma of the chest wall.

The patient has been seen in the follow-up regularly every 6 months the last time being June 10, 1978. There is absolutely no evidence of any recurrence and the original postoperative induction has entirely subsided.

Immediately after the operation the question of deep x-ray therapy was discussed and was not employed for two reasons. First this type of tumor is not very malignant and second because of the technical difficulties which would be encountered in keeping an infant of this age quiet during the course of treatment.

PYLORIC OBSTRUCTION

C M the patient is a girl of eighteen single born in the United States Her past history is irrelevant up to two years ago At that time because of symptoms similar to those about to be described an appendicectomy was performed in another hospital through a peculiar minute transverse incision in the right lower quadrant in the region of the anterior superior iliac

The patient was admitted to Lenox Hill Hospital December 27 1927 complaining of persistent vomiting pains in the right lower quadrant and loss of weight All these symptoms had been present for two years but had become acute in the past four months Vomiting occurred regularly fifteen minutes after every meal was spontaneous in character was without nausea and was frequently induced She was greatly constipated and frequently went five days without having a movement The pain in the right lower quadrant was constant followed meal and radiated to the right upper quadrant The remainder of her history is irrelevant

Physical examination showed a well-developed rather undernourished girl of eighteen not acutely ill but constantly complaining of pain The abdomen was not distended but was soft except for a certain rigidity especially in the upper right quadrant Some tenderness was present but no distinct mass could be felt There was tenderness in the epigastrium The liver and spleen were not palpable

Provisional Diagnosis—(1) Chronic duodenal ulcer with obstruction (2) Cholecystitis

Laboratory examinations showed a moderate anemia with normal white blood count Wassermann negative Gastric content light hypochlorhydria with normal titration Blood grouping? Kay report showed a persistent defect at the pylorus which strongly suggested an annular growth probably malignant The tumor itself markedly dilated the

greater curvature in the erect position being 6 cm. below the left crest. At the sixth hour there was a slight amount of gastric retention showing that the lesion at the pylorus was becoming obstructive. The transverse was markedly sagging. The gall bladder was gone over carefully and showed good dilatation, concentration and emptying power.

With the above findings exploratory laparotomy was advised.

Operation January 1, 1928. Under gas-oxygen and ether anesthesia a 4-inch median epigastric incision was made. A medium hard indurated area was found on the lesser curvature extending from the pylorus toward the cardia a distance of about 3 inches. There was no definite perforation but the gastrohepatic omentum was tightly adherent to this area. The pylorus was greatly thickened and quite hard. Numerous soft glands were seen in both the gastrohepatic and the greater omentum. There was no evident invasion of the duodenum. Grossly the condition impressed one as being multiple ulceration rather than carcinoma. The posterior portion of the stomach was not adherent to the pancreas.

A subtotal resection was done as follows. The lesser omentum was ligated as well as the blood vessel at the cardiac end and the lesser curvature of the stomach was freed to within 1 inch beyond the pylorus. By placing the hand beneath the stomach the anterior layers of the greater omentum were separated from the gastrocolic ligament and the greater curvature of the stomach was then liberated as well as the pylorus down to within 1 inch beyond the duodenum. The pylorus was then cut by means of the actual cautery after clamps had been placed and the duodenum after suture was invaginated by means of a purse string suture. This closed end was then sutured against the pancreas. The jejunum was identified and a long loop about 14 inches in length was pulled out of the wound and brought up anterior to the transverse colon. Before the portion of the stomach to be resected was removed this loop was sutured to the normal position of the stomach so that the distal portion of the jejunum was at the greater curvature of the stomach. The

stomach was then resected by means of actual cautery and the usual Iolya gastro enterostomy was done by means of an outer silk and an inner chromic suture. Extra silk sutures were placed at the angles of anastomosis at the lesser and greater curvatures. The wound was closed without drainage using No 2 plain gut sutures for the peritoneum interrupted chromic for the muscle and silk worm and silk for the skin.

During the operation the patient received into the thighs hypodermoclysis of 1200 c.c. Ringer's solution. Her condition was fair from a surgical standpoint but she took the anesthesia rather poorly.

Pathologic Report January 21 1928 *Diagnosis* ulceration of the stomach associated with marked lymphoid hyperplasia (gross appearance). The specimen consisted of a portion of stomach 15 cm. long by 9 cm. wide at the proximal end and 4 cm. wide at the distal or pyloric end received in the fresh state. About 1 cm. of the duodenum had been removed with the stomach. The pylorus was swollen thereby narrowing the pyloric opening rather markedly. Along the lesser curvature about 2 cm. proximal to the pyloric end of the stomach was a large irregular area of ulceration which roughly measured about 4 cm. in diameter. A strip of mucosa divided the ulcer into two approximately equal portions. Some omentum was attached to the outside of the stomach over the area of ulceration.

Microscopic Examination Sections into the pyloric region showed a very superficial erosion of the mucous membrane. The tunica showed a disappearance of most of the glands and was crowded with lymphoid cells many of which penetrated the muscularis mucosa and extended into the submucosa in the remnant of the wall they were comparatively scant occurring usually in small aggregates. They presented the characteristic appearance of small lymphocytes. Among them were noted a relatively few plasma cells and polymorphonuclear leukocytes. The stomach wall was extremely edematous. Section of the upper part of the specimen showed a similar lymphoid infiltration of the inner layer of the wall. In this

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(1) RECTAL POLYP SHOWING CARCINOMATOUS
CHANGES (2) HYPERTHYROIDISM TWO YEARS
LATER WITH DEATH

THE patient was a German aged forty six former occupation
bar tender

About two months before I saw the patient he had noticed
some bright red blood in his stool. He was examined by his
family physician who discovered a small rectal polyp. He was
examined by me on August 4 1925 and was found in good con-
dition. His abdomen was negative and the remainder of his
physical examination was not abnormal. Rectal examination
by means of a proctoscope revealed a rather large thumb size
soft polyp situated 3 inches within the rectum and arising from
the right posterior aspect. It had a constriction at its middle
and its base was broad. It bled readily. It seemed to arise or
to be continuous with one of the valves of Houston. Its ap-
pearance was that of an ordinary polyp and showed no external
signs of malignancy. Local excision was advised and the
patient was told that there was a possibility of the polyp either
being or later becoming malignant.

On August 5 1925 the patient was admitted to Lenox Hill
Hospital and under general anesthesia in the knee chest position
the rectum was dilated to its fullest extent and a large procto-
scope introduced. The polyp was seized with a tenaculum and
then a wide excision by means of the actual cautery was per-
formed. There was considerable bleeding. A rubber tube with
sponge packing around it was introduced.

Postoperative course uneventful

Pathologic Report *Diagnosis* Papillary adenocarcinoma
Of the specimen received in formalin contained an irregularly
shaped mass 5 cm in length 2 cm in width and 1
cm in thickness. One side of the specimen appeared smooth
and thick the other was well washed and presented a rather

region there was an ulcer the floor of which was formed by smooth muscle and granulation tissue. The surface of the ulcer was necrotic and the underlying tissues showed an infiltration of small round cells and eosinophilic leukocytes. In the immediate neighborhood of the ulcer there was not the extreme lymphoid infiltration noted elsewhere.

Postoperative course uneventful except for a slight separation in the middle of the wound with some discharge the cultures of which were sterile and which healed promptly under treatment. The patient was last seen in the follow up on June 10 1928 and was perfectly well. She had gained over 20 pounds in weight.

Comment—This case shows two things. First the truth of the oft repeated statement that a pain in the right lower quadrant is not always a chronic appendicitis and second in spite of careful pathologic examination the definite etiology of the pyloric ulcer and particularly of the peculiar lymphoid infiltration could not be ascertained. Repeated blood examination for a possible Hodgkins or other reticulo-endothelial disease revealed nothing.

This therefore was an apparently exceedingly early case of carcinoma which had not gone beyond the limits where a successful complete operation could be performed. The patient was advised of the condition and of the severity of the operation and decided to have it done. On August 29 1925 under general anesthesia a complete abdomino-perineal extirpation of the rectum and sigmoid to the middle of the descending colon was performed. A modified Miles technique was used and the operation was performed in one stage. The pelvic space below the newly formed floor of the pelvic portion of the peritoneum was filled with Mikulicz type tampon consisting of 4 to 10 loform gauze strips surrounded by a large fenestrated rubber dam. The wound was closed around this by silkworm sutures. The colostomy was left closed.

Pathologic Report *Diagnosis* carcinoma of the large intestine. Grossly the specimen consisted of a section of gut 24 cm in length. At one end was the anal orifice. Six cm from the anal orifice there was a limping of the mucous membrane which when mouthed out showed in its valley a circumscript red nodule 0.6 cm in diameter. On section this red area was seen to involve the muscular coat. The remaining portions of the mucosa showed no gross pathologic changes except for two minute well circumscribed areas 0.2 cm in diameter 14 cm from the anal orifice. The serous surface of the specimen had the normal appearance till attached. In this fat there were several small foci the largest of which measured 0.4 cm in diameter.

It appeared like lymph node. *Microscopic examination* of tumor taken away from the site of the original growth showed normal mucosa submucosa and muscular layer. Sections taken in the region of the growth showed areas separated by normal mucosa and muscularis. These too are apparently the site of the primary growth. In these areas there was a junction of the surface cylindrical epithelium beneath which there was a loose connective tissue richly supplied with blood vessels and moderately infiltrated with round cells and polymorphous leukocytes. In the connective tissue were isolated foci of epithelial cells which were multinucleated. Some

soft polypoid tumor The surface of the tumor was granular and a second presented a soft black center

Microscopic examination showed the specimen to be covered on one surface for a portion of its length by a normal mucous membrane typical of the large intestine At one portion of the normal mucous membrane there was an abrupt transformation into neoplastic tissue In the neoplastic tissue there were larger and smaller somewhat irregular acini lined by from one to



Fig 294—Especially the following deeper

several layers of columnar epithelium The epithelium differed from the normal in that the usual mucoid secretion of the cell was replaced by a hyaline acidophilic colloid The stroma supporting the neoplastic elements was loose somewhat edematous and intensely infiltrated with round cells Small acini were demonstrable in the muscular and beneath the submucular layers of the mucosa There were extensive areas of coagulative necrosis and hemorrhage

This therefore was an apparently exceedingly early case of carcinoma which had not gone beyond the limits where a successful complete operation could be performed. The patient was advised of the condition and of the severity of the operation and decided to have it done. On August 29 1935 under general anesthesia a complete abdominosacral extirpation of the rectum and sigmoid to the middle of the descending colon was performed. A modified Myles technic was used and the operation was performed in one stage. The pelvic space below the newly formed floor of the pelvic portion of the peritoneum was filled with Mikulicz type tampon consisting of 4 iodoform gauze strips surrounded by a large fenestrated rubber dam. The wound was closed around this by silk worm sutures. The colostomy was left closed.

Pathologic Report *Diagnosis* carcinoma of the large intestine. Crohn's specimen consisted of a section of gut 24 cm in length. At one end was the anal orifice. Six cm from the anal orifice there was a dimpling of the mucous membrane which when smoothed out showed in its valley a circumscribed reddish nodule 0.6 cm in diameter. On section this red area was seen to involve the muscular coat. The remaining portions of the mucosa showed no gross pathologic change except for two minute yellowish areas 0.2 cm in diameter 14 cm from the anal orifice. The serous surface of the specimen had the normal irregularities till attached. In the fat there were several small nodules the largest of which measured 0.4 cm in diameter which appeared like lymph nodes. *Microscopic examination* of a portion taken away from the site of the original growth showed a normal mucosa submucosa and muscular layer. Sections taken in this region of the growth showed two areas separated by normal mucous membrane. These two areas were apparently the base of the primary growth. In these areas there was a partial covering of the surface by cylindrical epithelium beneath which there was a loose connective tissue richly supplied with blood vessels and moderately infiltrated with round cell and polymorphonuclear leukocytes. In the connective tissue were isolated large epithelial cells which were multinucleated. Some

soft polypoid tumor. The surface of the tumor was granular and a second presented a soft black center.

Microscopic examination showed the specimen to be covered on one surface for a portion of its length by a normal mucous membrane typical of the large intestine. At one portion of this normal mucous membrane there was an abrupt transformation into neoplastic tissue. In the neoplastic tissue there were larger and smaller somewhat irregular acini lined by from one to



Fig. 294.—Early carcinoma with infiltration of deeper tissues.

several layers of columnar epithelium. This epithelium differed from the normal in that the usual mucoid secretion of the cells was replaced by a hyaline acidophilic colloid. The stroma supporting the neoplastic elements was loose, somewhat edematous, and intensely infiltrated with round cells. Small acini were demonstrable in the muscularis and beneath the submucosal layer of the muscle. There were extensive areas of coagulation necrosis and hemorrhage.

On examining the abdomen at this time there was a small area of tenderness above and to the outer side of the abdominal scar and it was thought most probable that a metastasis had appeared.

Roentgenologic examination of the gastrointestinal tract showed that there was no narrowing of the bowel although it appeared markedly spastic and that there was no evidence of any new growth. Two small diverticuli were noted in the ascending portion of the colon.

On September 1, 1927, his weight was 136 pounds and his condition generally worse. For the first time examination now showed a small, fairly hard swelling on the left side of the thyroid gland. A differential diagnosis between an enlargement of the thyroid and possible metastatic cervical lymph nodes could not definitely be made. By the beginning of October it was evident that the thyroid was greatly enlarged, was hard and nodular and a definite diagnosis of Graves' disease could be made. He was referred back to his physician after another thorough examination of his abdomen revealed nothing abnormal. He was put under intensive medical treatment for his hyperthyroidism but gradually and continually lost ground.

On January 19, 1928, he was again admitted to Lenox Hill Hospital with definite exophthalmos and beginning myocardial decompensation. At that time his blood picture showed nothing abnormal. His Wassermann was negative and his blood pressure was 115/60, his weight 115 pounds. His basal metabolism was +18 per cent. Eye examination revealed a protrusion of his eyes 20 mm. bilaterally. The pupils reacted normally but were dilated above normal. Muscles were normal. Visual field normal. Fundus. Pulsation of arteries in the disk seen. Von Graef sign present. Kocher sign present and Moebius sign present. Diagnosis from eye examination Graves' disease.

It should be added here that the patient had repeatedly previously refused surgical interference even the relatively simple procedure of ligation of the superior thyroid artery under novocain. His condition rapidly became worse and on January 28, 1928, he had an acute attack of dyspnea with cyanosis.

of these cell were found at a considerable depth. The muscular layers about the two areas mentioned were moderately infiltrated with round cell and showed a slight edema. There were no neoplastic cell demonstrable beneath the inner muscular coat. Sections of the adjacent perirectal tissues showed no evidences of neoplastic deposits. Evidently the entire tumor was removed at the original operation and were it not for the original specimens the neoplastic importance of the large cell previously mentioned might not have been recognized.

Postoperative course was quite satisfactory, the colostomy being opened at the end of four days. The median abdominal wound healed by primary union. The patient left the hospital on September 26th with the sacral wound also entirely healed.

From this time on the patient began to gain weight and except for the annoyance of the colostomy was free of symptoms and quite well. A daily early morning enema cleansed the bowel so that no further leakage occurred during the day. This important lack of continuous bowel movements was also helped by appropriate constipating diet. In April 1926 he had his first trouble with the colostomy and on examination it was found that a few hard feeling accumulations were present between the skin and the abdominal muscles and that a small ampulla had formed. The instillation of olive oil followed by an enema relieved this condition entirely.

To all intents and purposes the man was now healthy and enjoyed life under his altered circumstances when in July 1927 he was seen again and it was found that he had lost 15 pounds in weight, had difficulty in passing his enema tube, was weak, had headache and generally was nervous and not himself. His chief complaint at this time was impotence. Examination of the colostomy showed no reason for the difficulty in passing stool and a general examination revealed as the only abnormal condition to be actually found a pulse which was 110. A standard endocrine preparation containing among other things a small amount of thyroid extract was prescribed. When seen again two weeks later his condition was considerably worse. His weight had come down to 141 and his pulse was around 120.

At this time examination showed a sudden marked enlargement of the right lobe of the thyroid. This attack was accompanied by constant cough and drooling. A laryngeal examination showed the arytenoid not swollen the vocal cord somewhat congested and edematous and the examination suggested simple passive congestion. Because of the marked dyspnea and dysphagia Dr. John D. Kernan who was called in consultation advised an examination of the larynx and a bronchoscopic examination to determine if any other factors beside the enlargement of the thyroid were present. A bronchoscope was passed to the bifurcation and the trachea appeared to be slightly compressed from side to side but not sufficiently to interfere with breathing. A large quantity of secretion was found in the trachea and bronchi and this evidently had a great deal to do with the patient's difficulty in breathing.

The patient died suddenly the next day due to cardiac collapse caused by the acute hyperthyroidism.

Comment—This case is most interesting from several standpoints. First the finding of a very early carcinoma in a rectal polyp second the appearance of symptoms two years later which at first suggested metastasis but which finally proved to be an entirely separate condition namely acute hyperthyroidism. Although no specimen could be obtained for examination the unanimous impression was that the thyroid enlargement was not malignant.

